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4a. Participant Name and Address Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352				4b. Client Name and Address DOE-RL Richland, Washington 99352				
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9. Cost Status								
a. \$ Expressed in: Thousands								

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FY 1991 Project Plan for the
Hanford Environmental Dose Reconstruction Project,
Phase II

D. B. Shipler, Project Manager

February 1991

Pacific Northwest Laboratory
Richland, Washington

MASTER



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FY 1991 Project Plan for the
Hanford Environmental Dose Reconstruction Project
Phase II

D.B. Shipler, Project Manager

February 1991

This document has been reviewed
and approved by the Technical Steering Panel.



John E. Till, Chairman
Technical Steering Panel
Hanford Environmental
Dose Reconstruction Project


February 6, 1991

Date

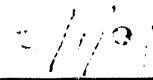
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Phase II

D. B. Shipler, Project Manager

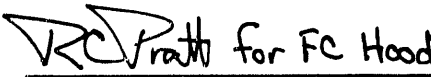
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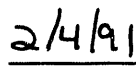
D. B. Shipler, Project Manager
Hanford Environmental
Dose Reconstruction Project




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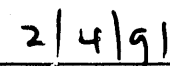
F. C. Hood, Director
Quality Programs



Date



W. L. Templeton, Manager
NEPA Implementation and Environmental
Documentation,
Office of Hanford Environment



Date

FOREWORD

The appendix contains a summary of TSP comments and Battelle responses on this project plan. In the plan, numbers in the margin are numbers of TSP comments. Words or sections in italics indicate changes made to respond to TSP comments or to correct other errors.

PROJECT OVERVIEW

The purpose of the Hanford Environmental Dose Reconstruction (HEDR) Project is to estimate radiation doses from Hanford Site operations since 1944 to populations and individuals. The primary objective of Phase II is to determine the appropriate scope (space, time, radionuclides, pathways and individuals/population groups) and accuracy (level of uncertainty in dose estimates) for the project. *Another* objective of Phase II is to use a refined computer model to estimate tribal and individual doses for the Hanford Thyroid Disease Study (HTDS). Project scope and accuracy requirements defined in Phase II can be translated into model and data requirements that must be satisfied during Phase III.

Phase II is anticipated to be completed in 15 to 18 months. A plan for FY 1991 of Phase II has been prepared based on activities approved by the Technical Steering Panel (TSP) in October 1990. The activities can be divided into four broad categories: 1) model and data evaluation activities, 2) additional dose estimates, 3) model and data development activities, and 4) technical and communication support.

MODEL AND DATA EVALUATION ACTIVITIES

8, 9

The following activities will be conducted to *accomplish initial Phase II objectives in FY 1991*:

- restructure the dose code and revise the interface between the air model and the dose code for estimating additional doses and conducting analyses
- prepare code design specifications for the project computer code to meet project objectives, incorporate enhanced atmospheric dispersion capabilities, and conduct sensitivity/uncertainty investigations
- help assess the accuracy of the project computer model by comparing its output with model output generated by the International Atomic Energy Agency "Validation of Model Predictions" program
- finalize estimates of iodine-131 releases from 1944 - 1947
- identify significant airborne and waterborne isotopes released from 1944 - 1957 other than the dominant radionuclides identified in Phase I
- conduct sensitivity and uncertainty analyses on the air dispersion model and upgrade it for application within the Phase I area
- help validate the project model by extending to 1951 the inventory of contamination data for vegetation within the Phase I area
- document iodine transfer factors and iodine age-dependent dose factors

ADDITIONAL DOSE ESTIMATES

- assist Native American tribes in acquiring and evaluating food consumption, demographic and agricultural data
- estimate doses for eight Native American tribes in the vicinity of the Phase I study area
- estimate doses for about 450 individuals in the pilot-scale phase of the HTDS

MODEL AND DATA DEVELOPMENT ACTIVITIES

- investigate the contribution of groundwater contamination to dose
- compile river and coastal radionuclide monitoring data for 1944 - 1989
- reevaluate and supplement milk production and processing data for the 10-county area

TECHNICAL AND COMMUNICATION SUPPORT

- continue document declassification and historical information retrieval
- continue quality assurance support
- continue statistical support to all tasks
- continue TSP public information support
- continue records management
- continue project administration

21 Table 1 shows the project work breakdown structure and budget by task. Figure 1 shows *the* project organization; Figure 2 shows the project *budget*, schedule and milestones for *HEDR staff at the Pacific Northwest Laboratory (PNL)*; and Figure 3 shows the *TSP* budget.

18, 20 *In Figure 2, page numbers associated with milestones refer to discussion of these milestones in this project plan. The milestones due in March 1991 that are shown as triangles are the final versions of Phase I reports; TSP comments will have been addressed. Milestones shown as triangles in months other than March, and milestones shown as circles, reflect new work conducted after Phase I.*

TABLE 1. HEDR Work Breakdown Structure for FY 1991

Task/Subtask	Task Manager	Budget (\$ in thousands) (a)
01 Project Management	DB Shipler	908
0101 Project Control		554
0102 Final Phase I Reports		114
0103 Records Control		70
0104 Peer Review		14
0105 Subcontract Administration		57
0106 Project Communication Support		99
02 Project Technical Integration	BA Napier	260
0201 Task Management/Project Integration		90
0202 Code Design Specification		119
0203 IAEA Model Intercomparison		51
03 Source Terms	CM Heeb	93
0301 Task Management		20
0302 Closure of Phase I Iodine Releases (1944-1947)		29
0303 Significant Airborne Isotopes Other Than I-131		22
0304 Significant Waterborne Isotopes (1944-1957)		22
04 Environmental Transport	SB Yabusaki	451
0401 Task Management		43
0402 Atmospheric Transport		257
0403 Groundwater Transport		59
0404 Surface Water Transport		92
05 Environmental Monitoring Data	RL Dirkes	41
0501 Task Management		0
0502 Vegetation Data		41
[0404 River Data Inventory (b)]		0
06 Demographics, Agriculture, Food Habits	RE Rhoads	221 (c)
0601 Task Management		30
0602 Preliminary Data for Native Americans		169
0603 Milk Model Refinements		22
07 Environmental Pathways and Dose Estimates	TA Ikenberry	223
0701 Task Management		26
0702 Code Restructure		125
[0602 Tribal Doses (b)]		0
0703 HTDS Doses		39
0704 Model Parameters (6-month delay)		33

- 17 (a) Budgeted amounts include project and task management as identified in each task, and include all Battelle overhead costs.
- (b) Activities in brackets are funded by tasks other than those under which they appear.
- (c) Includes \$90K for tribes.

TABLE 1. HEDR Work Breakdown Structure for FY 1991 (cont'd.)

<u>Task/Subtask</u>	<u>Task Manager</u>	<u>Budget</u> <u>(\$ in thousands) (a)</u>
08 Statistics	RO Gilbert	48
0801 Task Management		25
[0202 Dose Code Revisions (b)]		0
0802 Task Assistance		23
[0402 Sensitivity/Uncertainty of Air Model (b)]		0
09 Records Management	DL Alamia	75
10 Quality Assurance	R Cuello	59
11 Information Resources	SP Gydesen	164
1101 Task Management		16
1102 Declassification		87
1103 Resource Identification and Availability		61
^{85, 91} 12 TSP Communications Support	GL Harvey	148
1201 Task Management		39
1202 Video		29
1203 Public Opinion Survey		44
1204 TSP Communications Subcommittee Support		19
1205 <i>TSP Database and Audio-Visual Support</i>		17
Contingency	DB Shipler	400
Subtotal, HEDR Project Tasks		3,091
13 Technical Steering Panel		800
TOTAL		3,891

¹⁷ (a) *Budgeted amounts include project and task management as identified in each task, and include all Battelle overhead costs.*

(b) *Activities in brackets are funded by tasks other than those under which they appear.*

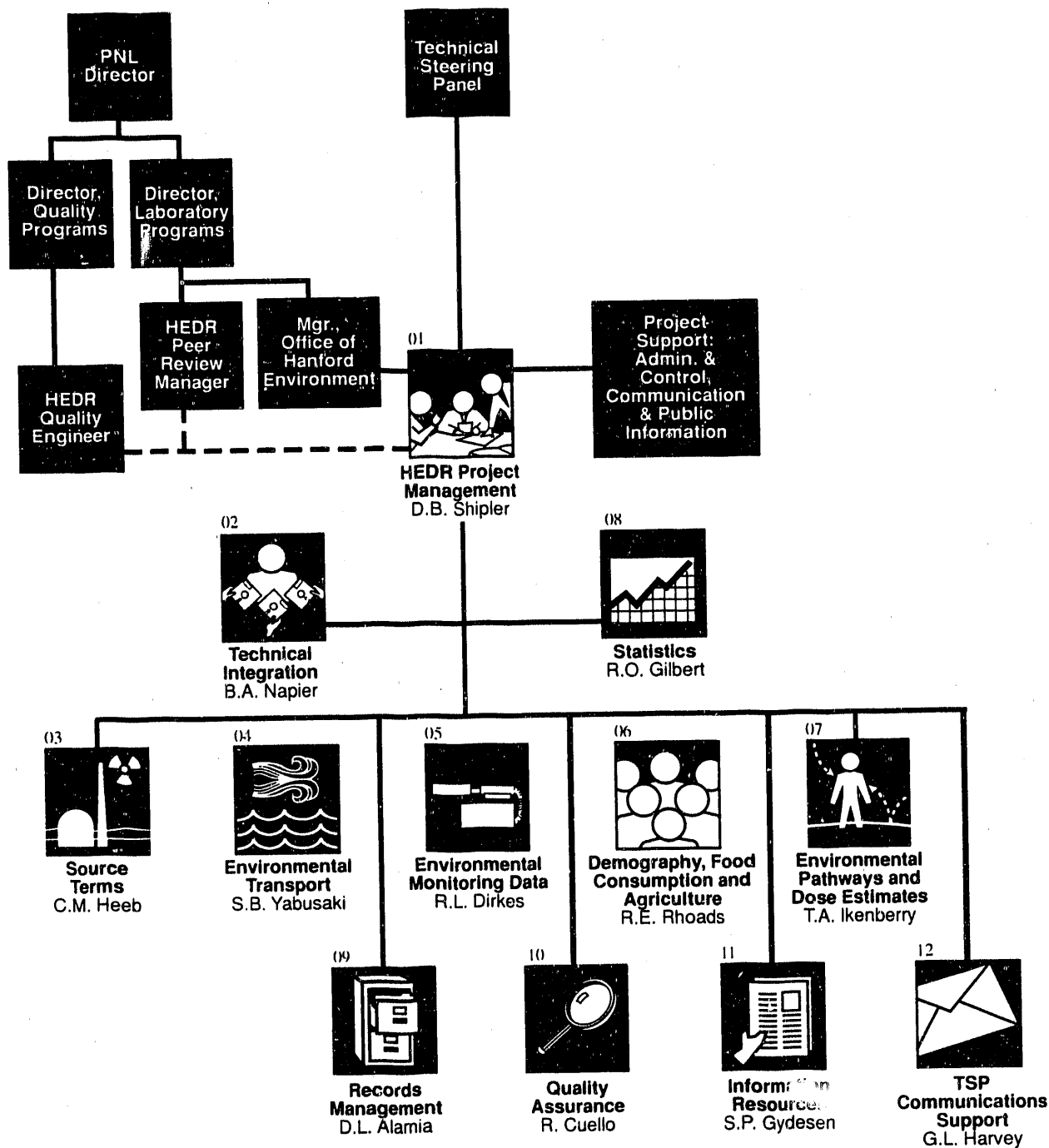


FIGURE 1. HEDR Project Organization

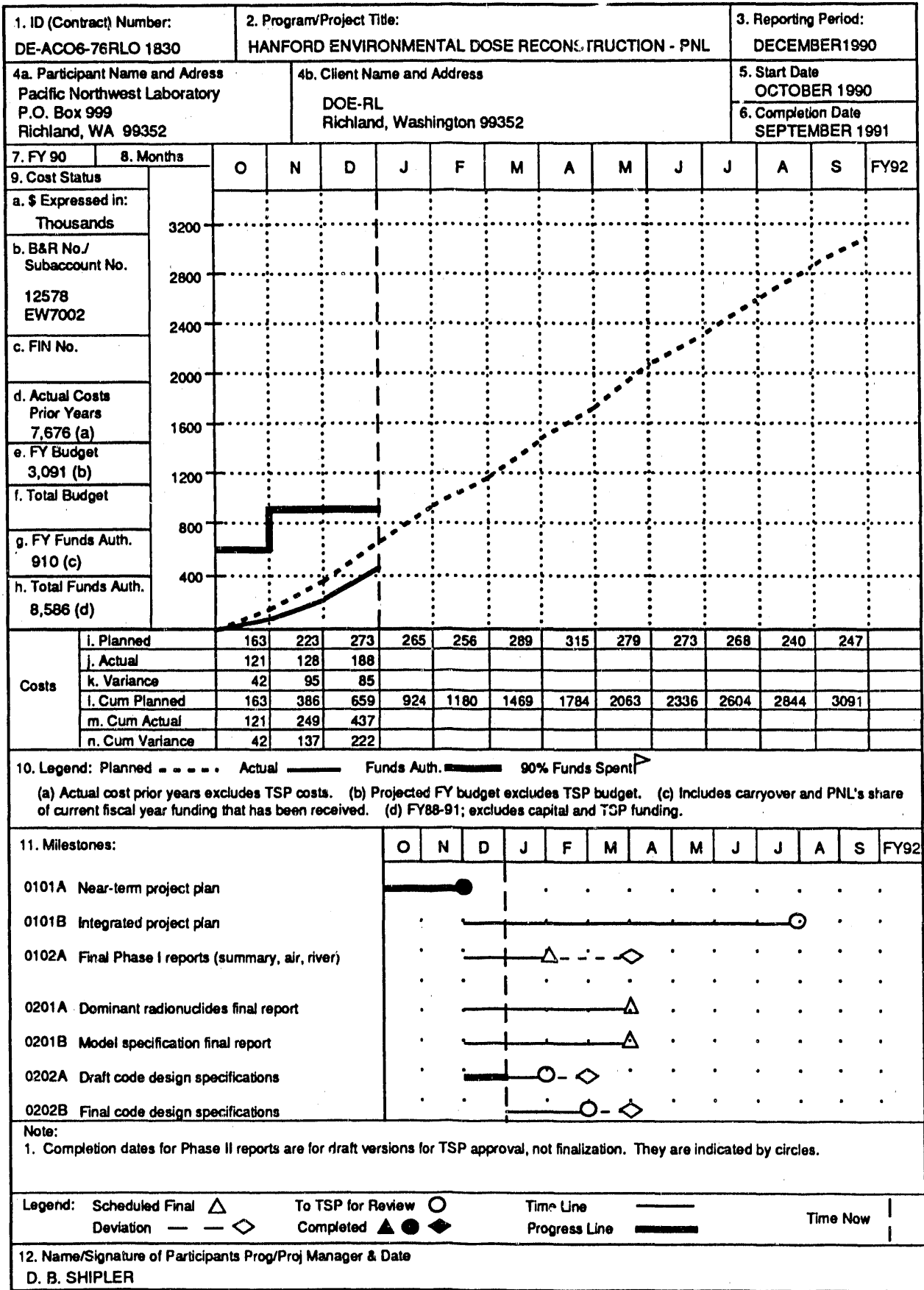


FIGURE 2. Project Summary Report - Pacific Northwest Laboratory

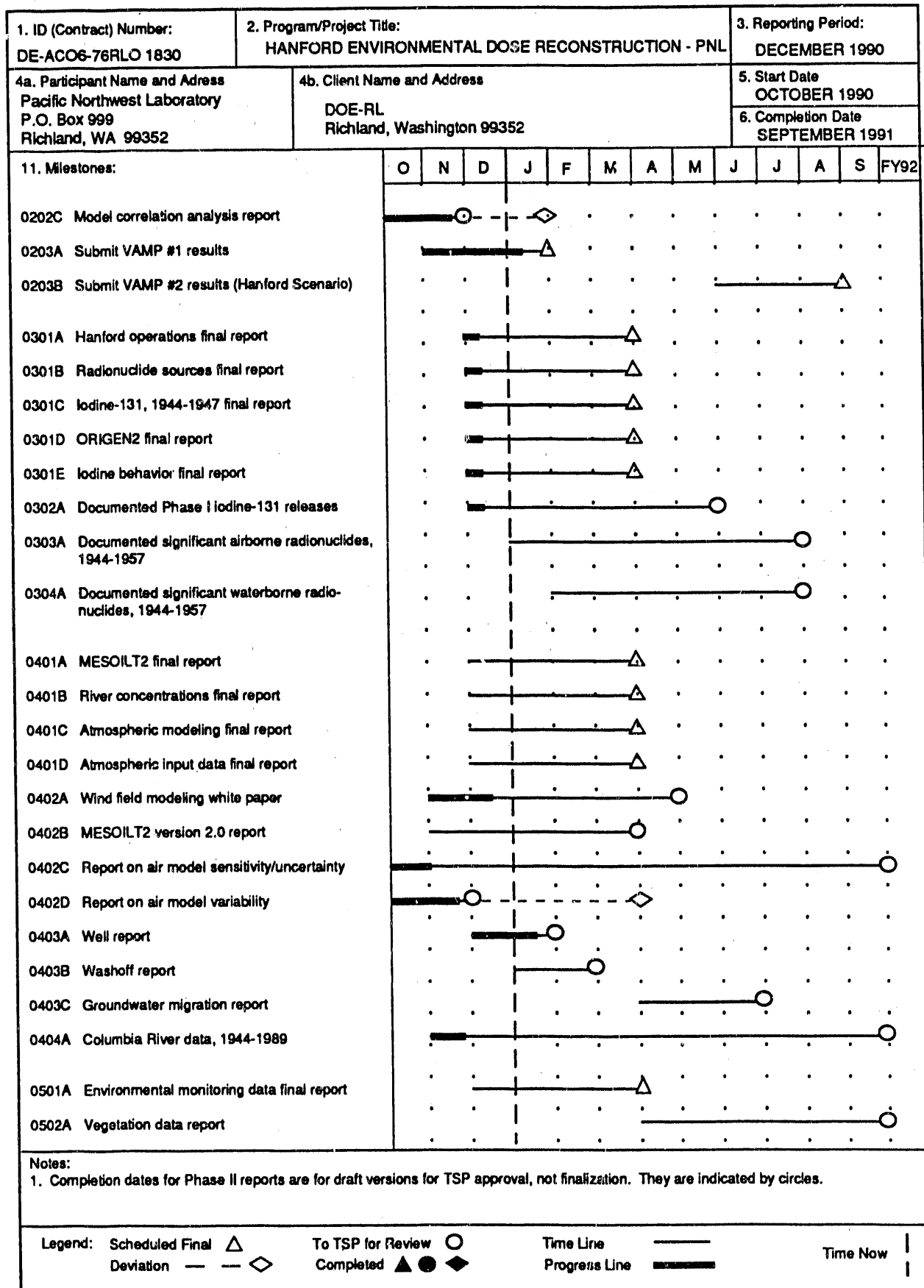


FIGURE 2. (contd)

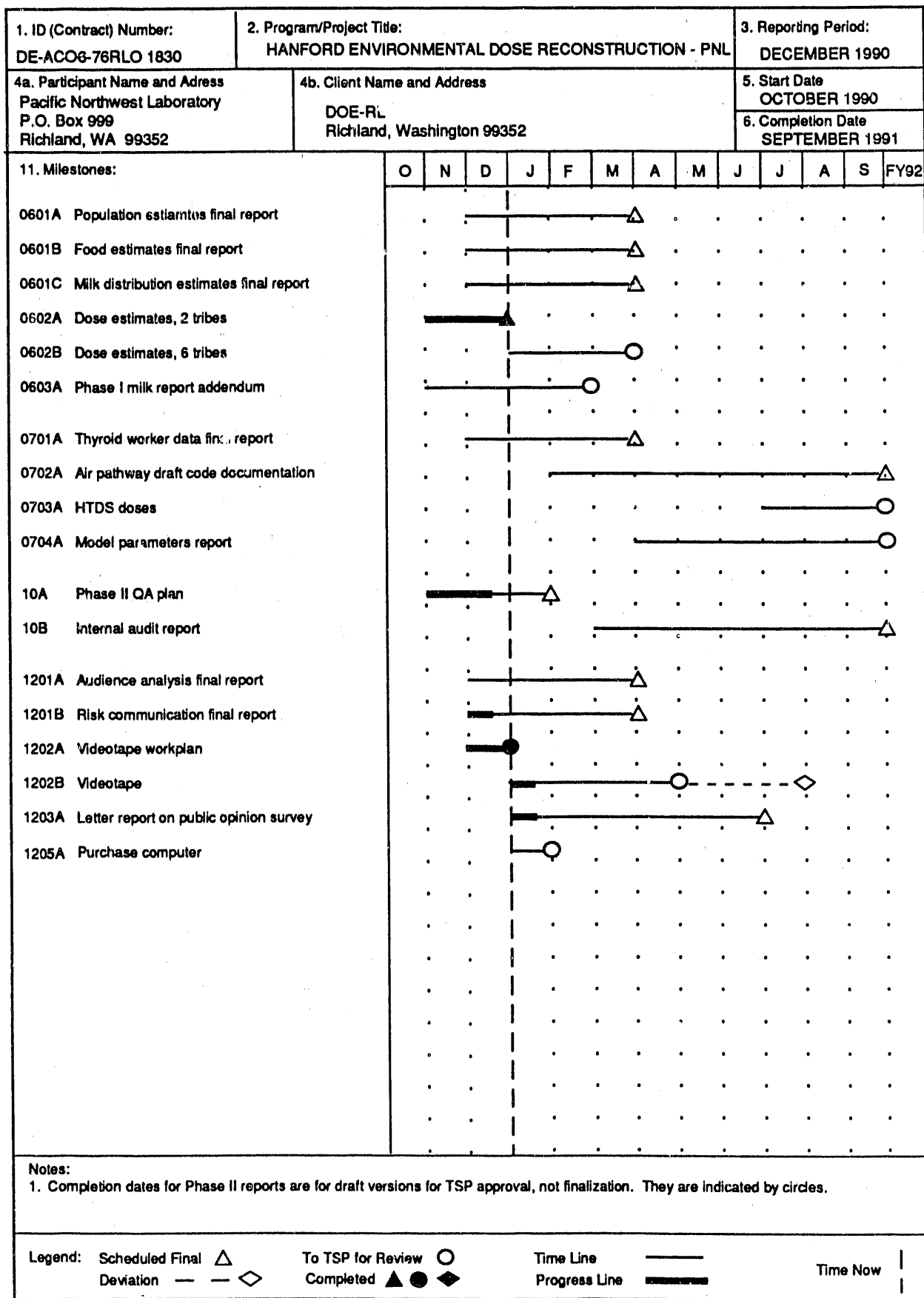


FIGURE 2. (contd)

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FIGURE 3. Project Summary Report - Technical Steering Panel

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INTRODUCTION

Phase I of the Hanford Environmental Dose Reconstruction Project was designed to develop and demonstrate a method for estimating radiation doses people may have received from Hanford Site operations since 1944. The method researchers developed relied on a variety of measured and reconstructed data as input to a modular computer model that generates dose estimates and their uncertainties. As part of Phase I, researchers used the reconstructed data and computer model to calculate preliminary dose estimates for populations in a limited geographical area and time period.

22, 1

Phase II, now under way, is designed to evaluate the Phase I data and model *and* improve *them* to calculate more accurate and precise dose estimates. Phase II will also be used to obtain preliminary estimates of two categories of doses: for Native American tribes and for individuals included in the *pilot phase of the Hanford Thyroid Disease Study (HTDS)*.

TSP Directive 90-1 required HEDR staff to develop Phase II task plans for TSP approval. Draft task plans for Phase II were submitted to the TSP at the October 11 - 12, 1990 public meeting, and, after discussions of each activity and associated budget needs, the TSP directed HEDR staff to proceed with a slate of specific project activities for FY 1991 of Phase II. This project plan contains detailed information about those activities.

Phase II is expected to last 15 - 18 months. In mid-FY 1991, project activities and budget will be reevaluated to determine whether technical needs or priorities have changed. Examples of work that may be added or postponed are

- collection of additional data for refinement of Native American dose estimates (this work would occur after initial tribal dose estimates are made)
- development of iodine and age-dependent transfer factors and default food consumption parameters for the dose estimation model
- 2 • *further model evaluations and restructuring*
- 2 • *further uncertainty and sensitivity analyses*
- additional support for TSP communications activities, such as an informational display.

The project plan will be updated and reissued as necessary to reflect new TSP direction.

Separate from, but related to, this project plan, will be an integrated plan for the remainder of the project. HEDR staff will work with the TSP to map out a strategy that clearly describes "end products" for the project and the work necessary to complete them. This level of planning will provide a framework within which project decisions in Phases II, III, and IV can be made.

This document began with a project overview, which included the purpose, strategy, work scope, milestones, and costs for FY 1991 dose reconstruction activities. The remainder of the project plan consists of the 12 task plans that discuss--for TSP-approved FY 1991 activities--scope, approach, deliverable items to the TSP, costs, and schedule.

In some cases, work activities described under one task actually contribute to other tasks. In these cases, the task that tracks the major activity and monitors the funding for that activity is considered the lead task, and the work is categorized under that work element in the work breakdown structure. For example, Task 08 includes dose code revision work that contributes to Subtask 0202, Code Design Specification. The dose code revision work--though conducted by Task 08 staff and described under Task 08 in this *project plan*--is categorized under Subtask 0202. Subtask 0202 tracks and monitors funding for the Task 08 dose code revision work.

Milestones listed in this project plan are defined as documentation to the TSP of completed, major HEDR activities.

TASK 01: PROJECT MANAGEMENT

BACKGROUND

The Project Management Task during Phase II includes those activities necessary to successfully plan and control the technical work assigned by the Technical Steering Panel (TSP).

SCOPE

Project management will provide planning, coordination, communication, information control, technical control, technical review, and administration of project work in accordance with approved task plans and directives from the TSP. The task is also responsible for producing progress reports of project technical work and for formal communications with the TSP. Subtasks are as follows:

- 0101 Project Control
- 0102 Final Phase I Reports
- 0103 Records Control
- 0104 Peer Review
- 0105 Subcontract Administration
- 0106 Project Communication Support.

PROJECT CONTROL (0101)

Scope

Project control includes those activities necessary to develop and implement task plans and control the work described in the task plans. It includes defining work, developing and controlling budgets and schedules, implementing processes and procedures, reviewing products, implementing and statuting corrective actions, and reporting. It also includes management activities to ensure and enhance leadership and technical performance by HEDR task leaders and performance of technical work by project staff.

Approach

3 *Project Management, through this Project Plan, will implement, track, and control the work to be performed during Phase II. Key to these administrative and control requirements are*

- the HEDR Quality Assurance Plan and implementing procedures
- conference records of meetings involving technical direction that may affect approved scope, cost, or schedule

- records of telephone communications involving technical direction that may affect approved scope, cost, or schedules
- weekly task reports, including status of task activities and interfaces; progress toward milestones; problems, potential problems, and solution alternatives; approved changes in scope, budget, or schedule; actual costs this period, cumulative costs this fiscal year, budget to date, and variances; other task information of interest
- task file keys and codes, including designation of quality records
- predesignated reviews and reviewers for specific deliverables, including clearance requirements
- maintenance of correspondence logs
- use of communication cover sheets on project documents
- identification, conduct, and recordkeeping of training for technical and administrative activities
- documentation of key decisions affecting technical performance, scope, cost, or schedule
- review, approval, and control of research notes, information, calculations, analyses, evaluations, and models.

18, 4,5 Proven project management techniques, as identified in the PNL Project Management System (PMS) manual PNL-MA-95, will be implemented. Planning will be accomplished by the development of task plans that are summarized into a project plan for each phase of the project and *costs estimated* by Fiscal Year (FY). Task plans will address the outline given in TSP Directive 90-1. Control of work approved in these task plans will be accomplished by applying procedures outlined in the Battelle Project Management System and reports provided through the Battelle Project Management Information System. *The project manager and task leaders will regularly evaluate performance, analyze cost and schedule variances, report on work, and apply corrective actions as necessary.*

6,7 Integrated project planning will be performed by defining *the* levels of detail for activities *during* various time intervals. Detailed project plans are developed for activities occurring in the near term (6 to 9 months), moderately detailed plans for activities predicted for the following six to nine months, and less detailed plans for the remainder of the project. As the project progresses and as knowledge increases, the mid- and far-range plans will be updated to provide more detail in 6-to-9-month periods. Activity plans include work scope, cost, schedule and relationships among the work scopes. This information will be maintained in an integrated database that will generate logic networks of activities so that potential or approved changes in planned activities (scope, cost, or schedule) can be evaluated relative to task and/or project objectives and goals. The development of the integrated project database will provide a basis for establishing a project cost/schedule based on defined objectives (end products and services) and technical work scope.

Milestones to the TSP

- 0101A near-term project plan (November 1990)
- 0101B integrated project plan (July 1991)

FINAL PHASE I REPORTS (0102)

Scope

28

The three draft technical reports documenting overall Phase I work (Draft Summary, Draft Air Pathway, Draft Columbia River Pathway) will be finalized by addressing TSP comments and obtaining TSP approval on the revised drafts. In addition, coordination and production support will be provided to HEDR staff for the finalization of the supporting Phase I technical reports. (See Tasks 02, 03, 04, 05, 06, 07, and 12 for titles of these reports.)

Approach

HEDR staff who generated the original reports will respond to TSP comments on the draft reports. Comments that address work now directed by the TSP to be handled in Phase II or later phases will be identified as such. The HEDR Project Office will coordinate the production of the final Phase I reports. Upon receiving written TSP approval, the Project Office will prepare copies of the final reports for TSP distribution to the public.

Milestones to the TSP

- 0102A final Phase I reports (summary, air pathway, river pathway) (January 1991)

RECORDS CONTROL (0103)

Scope

Records control includes activities necessary to maintain accurate project records and control project documents. These activities include verification of completeness and legibility of documents, maintenance and application of sequential numbering, maintenance of a database system and project files, and transfer of records to the PNL Records Center at regular intervals in accordance with approved procedures.

Approach

Battelle records management procedures and specific TSP and project requirements will be applied. The availability, accessibility, retrievability, and verifiability of project information will be maintained. In addition, the records will meet legal, regulatory, and quality requirements as established by Battelle and the project.

Milestones to the TSP

None.

PEER REVIEW (0104)

Scope

Peer review includes activities necessary to ensure that plans for technical work are complete, appropriate, and capable of meeting stated objectives, and that the results of technical work are sound, based on appropriate analyses, and meet stated objectives.

Approach

Classical peer review requirements will be applied to the review of task plans and task/project products. In addition, management review will be performed on presentation and information materials to ensure that project, TSP, and PNL policies and sensitivities are appropriately addressed.

Milestones to the TSP

None.

SUBCONTRACT ADMINISTRATION (0105)

Scope

Subcontract administration includes activities necessary to identify, acquire, control, provide status of, and report progress of consultants and other contract support for the project. These activities include definition of scope; preparation of budgets and schedules; technical proposal review and selection; technical direction; scope, cost and schedule control and reporting; and milestones for TSP evaluation.

Approach

Processes consistent with PNL subcontracting procedures and TSP directives will be implemented to procure consultants and maintain subcontracts to meet TSP, project management, and technical needs. TSP contracts will be coordinated in accordance with TSP direction. The status of contracts will be reported regularly using the PNL Project Management Information System (PMIS). Modifications will be processed through the PNL Contracts Department in accordance with written requests from authorized contract representatives.

Milestones to the TSP

None.

PROJECT COMMUNICATION SUPPORT (0106)

Scope

Project communication support includes three aspects:

- providing accurate and timely information to the TSP on a regular basis about the plans, progress, and results of the project
- responding to direct request for information from the media, the technical community, Battelle management, and other interested organizations and individuals
- planning and implementing internal project communication.

Approach

Project milestones, TSP directives, and requests for information will be evaluated to identify appropriate communication activities necessary to support dose reconstruction goals. Communication support will be provided for preparing monthly and other project reports, preparing other print and visual materials, presenting information at TSP meetings as requested, providing speakers for other events as requested, and providing other materials or services as requested. Activities for internal project communication involve developing policy and guidelines for communicating project results; advising HEDR staff on, and reviewing, project communication products; and ensuring HEDR staff are kept apprised of current project issues.

Milestones to the TSP

None.

QUALITY ASSURANCE

The HEDR QA plan will be updated to reflect the revised concepts of planning and achieving data quality objectives and closure on significant technical review comments by TSP and internal PNL project reviews. Planning and tracking of corrective actions will be addressed in a project procedure and included in QA audits. Regular QA audits will be performed and closed in accordance with the HEDR QA plan and PNL-MA-70.

INTERACTIONS

Task plans will identify relationships between project activities so that interfaces, dependencies, and coordinations can be managed. Project management will track these interfaces and ensure that their

functions are achieved. In addition, project management will network and track project activities and their dependencies to ensure that transfers of data and other information occur as planned.

ORGANIZATION

J. E. Till, TSP Chairman

01	Project Management	D. B. Shipler, Task Leader
0101	Project Control	D. B. Shipler, Subtask Leader
0102	Final Phase I Report	A. H. McMakin, Subtask Leader
0103	Records Control	J. M. Daer, Subtask Leader
0104	Peer Review	W. A. Glass, Subtask Leader
0105	Subcontract Coordination	S. M. Finch, Subtask Leader P. D. Richmond
0106	Project Communication Support	A. H. McMakin, Subtask Leader T. A. Nelson G. L. Harvey R. E. Rhoads

TASK 02: TECHNICAL INTEGRATION

BACKGROUND

Upon completion of Phase I and the subsequent TSP and public comments, several vital tasks for Phase II have become apparent. It is necessary to estimate radiation doses to actual individuals, to support the Hanford Thyroid Disease Study and to prepare for future HEDR needs. Additional dose estimates will require improvements to the computer model and to input data. The existing computer model, while sufficient for Phase I, does not adequately deal with spacial variability in the western regions of the domain (along the mountains) caused by sharp gradients in the atmospheric transport results. The model also lacks adequate correlation structure among many of the outputs. The code is not currently able to deal easily with individual data, because it is currently structured for the calculation of the Phase I "generic individual" results. Information and actions necessary to implement these improvements will be required from all project tasks, with a concomitant need for overall coordination and control of the effort by this task.

SCOPE

The purpose of this task is the provision of overall guidance and technical integration and communication among all other tasks. This task ensures that the outputs and formats of the results of each task fit the general needs of the project on an acceptable schedule, while still maintaining scientific integrity of each product.

The scope of work for Task 02 in FY 1991 can be broken into three subtasks:

0201 Task Management/Project Integration

0202 Code Design Specification

0203 IAEA Model Intercomparison Participation.

These subtasks are described in greater detail in the following sections.

TASK MANAGEMENT/PROJECT INTEGRATION (0201)

Scope

This subtask provides the general level-of-effort support for the project technical integrator. Included activities are preparation of a Phase II work plan, routine reporting, travel requirements, preparation of technical papers on subjects of current interest, control of task schedules and costs, and the planning and reviewing of all task activities. This subtask also includes resolution of TSP and public comments on the draft Phase I reports.

Approach

In general, technical integration is a level-of-effort task requiring the project technical integrator to be involved daily with various other task and subtask components of the project. Task management and control will be accomplished primarily through the system of project control initiated in Task 01 (Project Management) and other Battelle accounting systems already in place. The project technical integrator will maintain personal contact with task leaders and other HEDR staff to ensure that project milestones are defined, integrated, and met.

Milestones to the TSP

- 20 • 0201A "Selection of Dominant Radionuclides for Phase I of the Hanford Environmental Dose Reconstruction Project" (finalization of *Phase I report*) (March 1991)
- 20 • 0201B "Computational Model Design Specification for Phase I of the Hanford Environmental Dose Reconstruction Project" (finalization of *Phase I report*) (March 1991).

CODE DESIGN SPECIFICATION (0202)

Scope

- 30 A priority effort early in Phase II will be developing requirements to enable the enhanced computer code to estimate individual doses, incorporate enhanced atmospheric dispersion capabilities, and conduct sensitivity/uncertainty investigations. This subtask will be the lead for that effort, with input from the technical tasks. Techniques for computation will be investigated, selected, and documented in a report similar to that prepared for the Phase I code. (See Subtask 0202 in Task 08 for a description of dose code revision work, and see Subtask 0702 in Task 07 for a description of code restructure work.)

Approach

The Code Design Specification subtask will involve direct coordination and interaction with staff of Tasks 07 (Environmental Pathways and Dose Estimates) and 08 (Statistics). As innovative approaches are developed, trial applications will be prepared for their testing and evaluation. Letter reports on ideas considered but dismissed will be prepared for project files. Final selections will be documented in the design specifications for the Phase II code.

Milestones to the TSP

- 0202A draft code design specifications (*February* 1991)
- 0202B final code design specifications (*March* 1991)

IAEA MODEL INTERCOMPARISON (0203)

Scope

The HEDR Project is represented at the International Atomic Energy Agency (IAEA) coordinated research program on "Validation of Model Predictions" (VAMP) by this task. A test scenario, devised by the IAEA with Chernobyl data, will be investigated and the results submitted to IAEA for comparison with actual measurements. A similar scenario, devised with Hanford data, will be prepared and submitted to the VAMP participants to enable independent external calculations to be made. These external calculations will be compared with the HEDR Phase I estimates.

Approach

VAMP participation requires conversion of the IAEA sample problem into the data format used by the HEDR models and then running it. The results will be forwarded to IAEA for comparison to those prepared by other investigators and to actual data. Preparation of a test scenario for IAEA with HEDR input data can be done in the format prepared by IAEA and supplied to the other participants. Analysis of the results of the scenario will depend on completion by the IAEA participants, but is not currently envisioned before FY 1992.

Milestones to the TSP

- 0203A submission of VAMP test scenario 1 (January 1991)
- 0203B submission of Hanford test scenario (August 1991)

QUALITY ASSURANCE

Subtask 0201 requires no quality assurance/data verification activities other than those routinely applied via the project QA Plan. These include HEDR-specific procedures RMP-1, HEDR Records Control, HEDR-TP-2, HEDR Indoctrination and Training, HEDR-TP-5, HEDR Peer Review, and HEDR-TP-6, HEDR Review Process.

The Code Design Specifications subtask (0202) reflects a requirement of the PNL Software Control Procedures (SCPs) for design documentation for computer codes (SCP-70-312 and SCP-70-313). Actual coding and code maintenance will also conform to the SCP requirements (SCP-70-314 and SCP-70-315). A code Final Internal Development Review will be performed before calculations for members of the public are released (SCP-313).

Application of the data provided by IAEA (0203) will be guided by procedures on data transfer and data base management (SCP-70-317 and SCP-70-318). Application of the project computer model will fall under SCP-70-316.

INTERACTIONS

This task requires interaction with all of the other technical tasks of the HEDR Project. The Code Design Specification subtask will interact with Tasks 07 and 08 on the code adaptation to deal with correlations; Tasks 04, 07, and 08 (and maybe 03, if source term temporal variations are included) on the implementation of an improved atmospheric transport interface; and with Tasks 06 and 07 while dealing with the incorporation of potential new vegetable production/distribution models. Preparation of the VAMP submissions will require coordination with Task 07. Development of a Columbia River conceptual model will require coordination with Tasks 04 and 05.

ORGANIZATION

B. Shleien, TSP

02	Technical Integration	B. A. Napier, Task Manager
0201	Task Management	B. A. Napier, Subtask Manager
0202	Code Design Specification	B. A. Napier, Subtask Manager T. A. Ikenberry (Task 07) R. A. Burnett J. C. Simpson (Task 08)
0203	IAEA Model Intercomparison	B. A. Napier, Subtask Manager T. A. Ikenberry (Task 07) R. A. Burnett Programmer (TBD)

TASK 03: SOURCE TERMS

BACKGROUND

The Phase I iodine-131 releases documented in PNL-7253 HEDR were largely calculated from monthly average cooling times and from monthly tonnages of irradiated uranium dissolved. These data were obtained from J. D. Anderson's notebook HWN-1991. These data were used by Anderson to calculate the monthly releases documented in ARH-3026. The original 200 Area daily log books used by Anderson were destroyed. Attempts were made during Phase I to obtain more detailed information to check the Anderson estimates and to improve the accuracy of the release estimates. Further records searches are needed to make certain that all information sources are being used.

The Phase I dose estimates via the air exposure pathway were based solely on iodine-131, which was the largest contributor to the dose from Hanford emissions in the 1944-1947 time frame. Over time, the iodine emissions were drastically lowered by extending cooling times, installing stack gas filters and using silver reactors. The contribution of other radionuclides to the dose from airborne releases then became more significant. An initial survey of radionuclides that might contribute significantly to the air dose is required. The 1944-1957 time frame has been selected for Phase II.

- 33 For the water exposure pathway, an initial survey of radionuclides that might contribute significantly to the dose from the water pathway is required. The 1944-1957 time frame, *the time period before good records on water releases are available*, has been selected for *study* in Phase II.

SCOPE

Task 03 includes four subtasks:

- 0301 Task Management
- 0302 Closure of Phase I Iodine-131 Releases
- 0303 Significant Airborne Isotopes Other Than Iodine-131
- 0304 Significant Waterborne Isotopes.

TASK MANAGEMENT (0301)

Scope

This subtask includes activities necessary to plan task work, coordinate internally and with the TSP, ensure that work is carried out in accordance with approved plans, and present technical papers. The subtask also includes resolution of TSP and public comments on the draft Phase I reports.

Approach

Management and administrative procedures in place for the project will be applied to manage this task.

Milestones for the TSP

- 20, 35 • 0301A "A History of Major Hanford Operations Involving Radioactive Material" (finalization of *Phase I report*) (March 1991)
- 20, 35 • 0301B "Radionuclide Sources and Radioactive Decay Figures Pertinent to the HEDR Project" (finalization of *Phase I report*) (March 1991)
- 20, 35 • 0301C "Iodine-131 in Irradiated Fuel at Time of Processing from December 1944 through December 1947" (finalization of *Phase I report*) (March 1991)
- 20, 35 • 0301D "Uncertainties in Source Term Calculations Generated by the ORIGEN2 Computer Code for Hanford Production Reactors" (finalization of *Phase I report*) (March 1991)
- 20, 35 • 0301E "Fission-Product Iodine During Early Hanford-Site Operations: Its Production and Behavior During Fuel Processing, Off-Gas Treatment, and Release to the Atmosphere (finalization of *Phase I report*) (March 1991)

CLOSURE OF PHASE I IODINE-131 RELEASES (1944-1947) (0302)

Scope

Staff will search for missing data and specifically for cooling times that will provide an upper bound to the iodine-131 release estimates. It is recognized that the data may not be complete enough to cover the 1944-1947 time period continuously, and that the Anderson numbers may have to be used for at least parts of the time period. The overlapping periods will be compared with the Anderson results.

The Phase I iodine-131 releases will be recalculated using the new data inputs. The data sources will be referenced and decisions involving data selection will be documented. The monthly total estimates will be tabulated, including upper and lower bound estimates.

The methods used in calculating the iodine-131 content will be documented and the basic inputs to the calculation tabulated. Assumptions regarding the release factor will be documented with appropriate references.

Approach

The iodine-131 content of irradiated fuel is determined by the specific power and by the cooling time. Old Hanford records (called P-Department records) were found during Phase I that provide daily power operating histories from startup to beyond 1947, the Phase I cutoff date. They include complete discharge records. The records were transcribed to magnetic media and are available to estimate the iodine-131 content at the time of discharge.

Cooling time data now in hand supplemented by the additional information from the records search will be used to form the final estimates.

Milestones to the TSP

- 0302A report containing revised iodine-131 releases by month with upper and lower bounds (May 1991). Report will include the method used in calculating the releases and all input data references and decisions made concerning the selection of the input used in the final calculation.

SIGNIFICANT AIRBORNE ISOTOPES OTHER THAN IODINE-131 (0303)

Scope

The project literature on airborne releases from 1944-1957 will be reviewed and compared with the current list of dominant HEDR radionuclides. The project literature may provide examples of radionuclides which, at the time, were thought to be significant, and these will be added to the list of HEDR dominant radionuclides for consideration.

Release mechanisms will be identified. Data availability will be defined and the level of effort determined to provide a comprehensive set of release estimates for the 1944-1957 period.

Approach

Feedback from the HEDR Technical Integrator (Task 02) will be required to provide an updated list of dominant radionuclides and also to assess the importance of new radionuclides that may turn up as a result of the data search. These will be radionuclides that were deemed to be of importance at the time the data were generated, but that are not included among the HEDR dominant radionuclides.

Milestones to the TSP

- 0303A report containing the task results, including a list of radionuclides that contributed significantly to the airborne dose, applicable data sources, feasibility assessed for complete coverage of the 1944-1957 time period, and estimates of the level of effort required to provide complete monthly values covering the time period (July 1991)

SIGNIFICANT WATERBORNE ISOTOPES (1944-1957) (0304)

Scope

The project literature on waterborne releases from 1944-1957 will be reviewed and compared with the current list of dominant HEDR radionuclides. The project literature may provide examples of radionuclides which, at the time, were thought to be significant, and these will be added to the list of HEDR dominant radionuclides for consideration.

Release mechanisms will be identified. Data availability will be defined and the level of effort determined to provide a comprehensive set of release estimates for the 1944-1957 period.

Approach

Feedback from the HEDR Technical Integrator (Task 02) will be required to provide an updated list of dominant radionuclides and also to assess the importance of new radionuclides that may turn up as a result of the data search. These will be radionuclides deemed to be of importance at the time the data were generated, but which were not included among the HEDR dominant radionuclides.

Milestones to the TSP

- 0304A report containing the task results, including a list of radionuclides that contributed significantly to the waterborne dose, applicable data sources, feasibility assessed for complete coverage of the 1944-1957 time period, and estimates of the level of effort required to provide complete monthly estimates covering the time period (July 1991)

QUALITY ASSURANCE

Data sources will be documented. Traceability on all calculations from the initial source will be maintained. Hand calculations will be performed according to Battelle procedure PAP-70-301. Software control procedures SCP-70-312 through 317 will be followed where applicable.

INTERACTIONS

Information from Task 02 (Technical Integration) will be used to provide an updated list of dominant radionuclides for the air and water pathways through 1957. Updated source term information will be provided to staff from Tasks 02 and 07 (Environmental Pathways and Dose Estimates) for use in Phase II dose estimation.

ORGANIZATION

TSP Source Term Subcommittee

M. A. Robkin, Chairman

B. Shleien

39

03	Source Terms	C. M. Heeb, Task Leader
0301	Task Management	C. M. Heeb, Subtask Leader
0302	Closure of Phase I Iodine-131 Releases	C. M. Heeb, Subtask Leader
0303	Significant Airborne Isotopes Other than Iodine-131	C. M. Heeb, Subtask Leader R. B. Hall
0304	Significant Waterborne Isotopes	C. M. Heeb, Subtask Leader R. B. Hall

TASK 04: ENVIRONMENTAL TRANSPORT

BACKGROUND

The Environmental Transport Task is responsible for providing the HEDR Project with radionuclide concentrations to be used in estimating doses. Three environmental media are specifically addressed: atmosphere, groundwater, and surface water. The atmospheric transport subtask reconstructs the transport of radionuclides released from the stacks of the chemical separations facilities in the 200 Area. The groundwater transport subtask is concerned primarily with the migration of radionuclides disposed of in the subsurface environment. The surface water transport subtask reconstructs the transport of radionuclides released to the Columbia River during the operation of reactors.

In Phase I, atmospheric modeling options were evaluated and a Lagrangian-puff approach to dispersion modeling was recommended for use in the project. The viability of this approach was demonstrated in the Phase I calculations using a slightly modified version of an existing model. An atmospheric transport workshop was held following completion of the Phase I calculations. Participants in the workshop identified several areas in the dispersion model where modifications should be considered.

The Columbia River system can be separated into three distinct segments or areas for study under the HEDR Project: 1) the Hanford Reach (upstream segment) extending from Priest Rapids Dam to McNary Dam, 2) from McNary Dam to the mouth of the Columbia River including the estuary, and 3) the coastal waters in the vicinity of the river mouth. Though construction did not begin on McNary Dam until the 1950s, the Hanford Reach can be bounded downstream by Wallula Gap (near McNary Dam) for the early release years beginning in 1944.

SCOPE

40 Phase II will be used to acquire information necessary to define the contribution of the Environmental Transport Task to the final HEDR dose estimates. Among the important decisions that will be made *as part* of Phase II are

Atmospheric

- 1) Is the puff trajectory model appropriate for this study?
- 2) Should interpolated wind fields be used?
- 3) Should uncertainty be explicitly included in the formulation of the transport model?

Groundwater

- 1) What aspects of radionuclide transport by groundwater will be appropriate for further study?

Surface Water

- 1) Which areas and time periods will be selected for more detailed analysis?
- 2) Which exposure pathways, including water, sediment, and biota, will be selected for more detailed analysis?
- 3) How will monitoring data and modeling be used?

The four subtasks for the Environmental Transport Task are shown here and described in greater detail in the following sections:

0401 Task Management

0402 Atmospheric Transport

0403 Groundwater Transport

0404 Surface Water Transport.

TASK MANAGEMENT (0401)

Scope

Task management activities include

- planning, scheduling, budgeting, reporting, reviewing
- responding to project management needs
- coordinating activities with other tasks
- resolving TSP and public comments on the draft Phase I reports
- interfacing with TSP counterparts
- travel.

Approach

The above activities will be performed to ensure that Task 04 milestones and deliverables are completed to the satisfaction of all parties.

Milestones to the TSP

- 20 • 0401A "MESOILT2, A Lagrangian Trajectory Climatological Dispersion Model" (finalization of *Phase I report*) (March 1991)
- 20 • 0401B "Estimates of Columbia River Radionuclide Concentrations: Data for Phase I Dose Calculations" (finalization of *Phase I report*) (March 1991)

- 20 • 0401C "Atmospheric Transport and Dispersion Modeling for the Hanford Environmental Dose Reconstruction Project" (finalization of Phase I report) (March 1991)
- 20 • 0401D Atmospheric Transport Modeling and Input Data for Phase I of the Hanford Environmental Dose Reconstruction Project" (finalization of Phase I report) (March 1991)

ATMOSPHERIC TRANSPORT (0402)

Scope

43 The Atmospheric Transport Subtask estimates average air concentrations, deposition rates and surface contamination resulting from the release of radionuclides to the atmosphere. The primary effort of the Atmospheric Transport subtask for Phase II is to upgrade the atmospheric dispersion model for *dose assessment for the remainder of the project*. Four work elements have been established to meet this objective:

- estimation and evaluation of uncertainty in the dispersion model results
- evaluation of alternative methods of generating wind fields used in estimating model transport
- addition of model refinements needed to improve model accuracy
- evaluation of the sensitivity of model results to changes in the model parameters and parameterizations.

Two additional task elements have been defined to support the modeling effort:

- acquisition and preparation of meteorological data for use by the dispersion model
- response to project needs.

During FY 1991, the work on the atmospheric transport subtask will concentrate on the first three and the sixth elements. Work will be performed on the fourth and fifth elements as needed to support the primary effort and as time and funds are available.

Approach

The first two task elements in the Atmospheric Transport subtask deal with major extensions of the dispersion model. They directly address concerns expressed by participants in the atmospheric transport workshop, as discussed in the following sections.

Dispersion Model Uncertainty

Uncertainties associated with dispersion modeling in the HEDR Project will be explored. Sources of uncertainty include uncertainty in the amount of material released, in the times of releases, in the meteorological data, and in the structure and parameters of the model. We will determine how each of these factors affects the overall uncertainty in the model output with the goal of improving estimates of the overall

uncertainty. (Subtask 0402 in Task 08--Sensitivity/Uncertainty of Air Model--will contribute to this effort by conducting bench-scale sensitivity and uncertainty analyses.) Work on this element is expected to continue into FY 1992.

Wind Fields

Methods of estimating wind fields used in the atmospheric dispersion model will be explored. We will first review the wind field models used in other regional dispersion models, then review alternative wind field models not in use in dispersion models. The results of these reviews will be used as a basis for a recommendation to the TSP. Possible recommendations include use of the current wind field model, implementation of an alternative wind field model from another code, or development of a new wind field model. Work on this element may continue into FY-1992, if the results of the reviews indicate that a change in the wind field model is warranted and the TSP directs us to make the change.

Model Refinements

This element covers several small additions and changes to the model that are needed to improve model accuracy and credibility. These changes, which include modification of the deposition model, addition of plume rise, computation of air concentrations and deposition near the source, and computational check of the mass balance, were discussed at the workshop. All of these changes can be made using existing technology.

Model Sensitivity

We will perform tests designed to evaluate the sensitivity of model results to significant changes in model components and data availability. Test results will be used to make recommendations related to future model development activity. The tests are not intended for use in an overall HEDR model sensitivity study. Several of the tests can be conducted by varying option selections in the existing model; others will require initial implementation of the feature to be tested or entry of additional data. (Subtask 0402 in Task 08--Sensitivity/Uncertainty of Air Model--will contribute to this effort by conducting bench-scale sensitivity and uncertainty analyses.) Work on this element will begin at a low level in or after the second quarter of FY 1991.

Meteorological Data

This element covers data acquisition and preparation of the meteorological database for use with the dispersion model. Work on this element will be limited to providing any additional data required to support the work in other task elements.

Project Needs

This element provides funding to cover subtask staff attendance at meetings and responses to specific requests from HEDR project management and the TSP.

Milestones to the TSP

- 0402A a report presenting the results of the reviews of current and potential approaches to modeling wind fields for Lagrangian puff dispersion models and recommendation to the TSP of an approach for HEDR (April 1991)
- 0402B a report documenting the refined HEDR dispersion model. This model will still be subject to modification based on the results of the work in task elements 040201, 040202, and 0402034 (March 1991)
- 0402C a report on sensitivity/uncertainty of air model (September 1991)

GROUNDWATER TRANSPORT (0403)

Scope

47 This subtask has three work elements: wells, washoff, and offsite groundwater migration. *The time frame under investigation is 1944 through 1989.*

Wells

The Phase II work on wells is divided into two parts, called A and B.

- A. We will generate a list of the wells on the Hanford Site containing concentrations of radionuclides of Hanford origin that were used for drinking water. The maximum individual intake of important radionuclides that may have resulted from this water use will be estimated. This review will result in an update of the report "Response to TSP Directive 88-4, Ground-Water Contamination Data," dated March 16, 1989.

Approach

The Hanford Environmental Health Foundation surveillance of sanitary water supplies at the Hanford Site includes comparison against radiological dose standards. Annual environmental monitoring reports prepared for the Hanford Site are another source of dose estimates. These dose estimates can be supplemented with calculations by staff in Task 07 (Environmental Pathways and Dose Estimates) if necessary.

- B. An estimate will be made of the contribution of radionuclides of Hanford origin from the Columbia River to riparian wells downstream of the Site. Major irrigation wells, municipal wells, and industrial wells that can be identified from existing records will be included.

Approach

A list of riparian wells used for irrigation, municipal water supplies, and industrial water supplies has been compiled by staff in Task 06 (Demographics, Agriculture, and Food Habits). This list will be published in a document as part of this subtask. The impacts for withdrawals from the wells will be estimated based on impacts calculated during Phase I of the surface-water pathway. The impacts will be equal to or less than those estimated for withdrawals directly from the river because of mixing with unaffected groundwater.

Milestones to the TSP

- 45 • 0403A draft report for TSP approval describing the approach and results of well analysis, *including a bibliography* (January 1991)

Washoff

We will investigate the possibility that significant amounts of radioactive fallout from Hanford were washed off small watersheds and recharged shallow aquifers that feed springs and wells. The assumption of a small watershed with minimum sorption of radionuclides (such as a bare rock surface) will be used to evaluate this possibility.

Approach

Staff will perform a simple calculation of air deposition, watershed runoff, recharge to a shallow aquifer, and transport to a spring or well. The starting point will be predicted deposition for a hypothetical location included in the Phase I atmospheric transport model and predictions for other radionuclides that may be important. Simplifying assumptions such as a bare rock surface for the watershed and short travel times through the shallow aquifer will be made for the calculation. The approach, assumptions, calculations, and results will be summarized in a report.

Milestones to the TSP

- 45 • 0403B draft report for TSP approval summarizing the approach, assumptions, and results of the washoff analysis, *including a bibliography* (February 1991)

Offsite Groundwater Migration

This work is divided into two parts, A and B.

- A. We will estimate the discharges of radionuclides into the Columbia River from groundwater originating in the 100, 200, and 300 Areas of the Hanford Site, based on simplifying assumptions. The contribution of these discharges to the overall radionuclide concentrations in the Columbia River will also be evaluated.

Approach

Discharge of contaminants to the Columbia River is a complex issue; we will address it with a relatively simple approach. The discharge of radionuclides that originated in the 200 Areas of the Hanford Site to the Columbia River will be estimated by simple mass flux calculations. A discussion of when the contamination reached the river and began discharging will be included in the analysis of contamination of 200 Area origin. The mass flux calculation will be based on concentration data and volumetric flow rates. The concentration data will be obtained from monitoring wells adjacent to the river at the discharge location and the volumetric flow rate will be estimated with a groundwater flow model or simple flow-net calculation. Discharge of contaminants from the 300 Area to the river will be estimated in a similar manner to that used for the 200 Area discharges.

Estimates of discharges from the 100 Areas will be based on simplifying assumptions and previous investigations. For Phase I, the outfall from the operating reactors was assumed to be discharged directly to the river following a 4-h retention time. The retention basins leaked and the groundwater flow paths to the river were very likely longer than the 4-h retention times. A simple calculation of travel time to the river based on expected hydraulic properties of the aquifer, height of ponding in the retention basin, and flow path distance to the river will be made to determine the impact of the groundwater flow path. Previous investigations of the 100-N Area trenches will be summarized and presented.

- B. We will evaluate the possibility that contaminated groundwater migrated off the Hanford Site and into private wells. Previous discussions of this topic will be referenced and evidence pro and con will be presented. The possible maximum radionuclide concentrations in offsite wells, if any, will be estimated.

Approach

Previous evaluations of offsite migration will be reviewed and summarized to address this subtask. Both the unconfined aquifer system and uppermost confined aquifers will be included. These evaluations include those done by Hanford Site contractors as well as the state of Washington. Current work being funded by the Hanford Site groundwater monitoring project at PNL will be incorporated into the evaluation as results become available. A conceptual model of groundwater flow in the unconfined aquifer and discharge to the river from both the Benton and Franklin County sides of the river will be presented.

Milestones to the TSP

- 45 • 0403C draft report for TSP approval summarizing the results of groundwater migration on and off the Hanford Site, *including a bibliography* (June 1991)

SURFACE WATER TRANSPORT (0404)

Scope

The Surface Water Transport Subtask is responsible for coordinating the compilation of the Columbia River and coastal radionuclide monitoring data with the Environmental Monitoring Data Task (Task 05). The data search will consider the available information regarding radionuclides in the water column, sediments, and aquatic organisms for the time period 1944-1989. The available documents will be discussed and identified in a bibliography. Selected data sets will be summarized in tables and graphs to convey the information necessary for decision-making in subsequent phases of the HEDR Project. (See Subtask 0404 in Task 05 for a description of the collection of river data.)

Approach

Data already in hand and that to be assembled under Task 05 (Environmental Monitoring Data) will be reviewed and evaluated with respect to its applicability to the HEDR Project objectives. A summary of the data references will be prepared to include information on who collected the data, what was collected, and how frequently the data were collected. Where appropriate, the data will be presented as ranges of values instead of reproducing the entire data set. Typical data sets will be illustrated with graphic plots and diagrams. The results will be categorized with respect to the Hanford Reach, the lower Columbia River, and coastal areas. During the course of the work, close coordination will be maintained with Dr. Pete Klingeman. The following items will be reviewed in this work element:

- radionuclide loading to the Columbia River from reactor operations
- water column concentrations of radionuclides in dissolved and particulate form
- suspended sediment concentrations and radionuclide concentrations in bed materials
- biological data will include the results of analysis on aquatic organisms and waterfowl examined for radionuclide concentrations (e.g., coastal shellfish).

Where available, surface-water radionuclide data collected by the states of Washington and Oregon, Corps of Engineers, U.S. Geological Survey, and universities will augment the data obtained from studies performed by Hanford contractors.

Milestones to the TSP

- 0404A draft report that summarizes the available Columbia River data, including results of Task 05 (Environmental Monitoring Data) (September 1991)

QUALITY ASSURANCE

Within the HEDR Project, the Environmental Transport Task relies on databases managed by two other HEDR tasks: Environmental Monitoring Data (Task 05) and Source Terms (Task 03). These databases relate primarily to radionuclide source terms and distributions. The Environmental Monitoring Data and Source Term tasks are responsible for ensuring the quality of these databases.

48 The Environmental Transport Task also uses information from references external to the project for transport parameters (meteorologic and hydrologic) and independent radionuclide measurements. It is the responsibility of the Environmental Transport Task to reference the source of internal and external data and to identify how these data are used. *This includes documenting information about how data were verified or validated, and why selected data were used and any other data were not used.* Data traceability and verification are reviewed periodically by the project QA officer and TSP observers.

In addition to data, the Environmental Transport Task is also responsible for ensuring the quality of computer codes developed in the task to model environmental transport of radionuclides. These codes are subject to verification and validation protocols that have yet to be identified by the project. In the meantime, PNL software control procedures are appropriate.

Modifications to the interim model used in HEDR Phase I in Task Element 040203 will be made in accordance with appropriate PNL procedures. These procedures include preparation of a Software Requirements Form in accordance with SCP-70-312; Final Internal Development Review of Software and Documentation (SCP-70-313); Software Configuration Management (SCP-70-314); and Conversion Testing, Verification and/or Validation of Software (SCP-70-315).

Only computer codes that have been verified and are under configuration management will be used for calculations intended for use in dose projections. Uncontrolled codes may be used in the model uncertainty and sensitivity task elements provided that pertinent portions of the code have been verified and the differences between the code and a documented version are noted. Uncontrolled codes may be used for internal code development testing without restriction.

Reports will be subjected to the normal peer review process.

INTERACTIONS

This task is driven by the Environmental Pathways and Dose Estimates Task (Task 07), which aggregates the effect of exposure to radionuclide distributions into a dose estimate. In the analysis of transport through the environment, source term information from the Source Terms Task and monitoring information from the Environmental Monitoring Data Task are necessary. The Technical Integration Task (02) defines the products required from the atmospheric dispersion model. The Statistics Task (08) will assist in definition of the required products and in the uncertainty and sensitivity task elements.

ORGANIZATION

TSP Environmental Transport Subcommittee P. C. Klingeman, Chairman

04	Environmental Transport Task	S. B. Yabusaki, Task Leader
0401	Task Management	S. B. Yabusaki, Subtask Leader
0402	Atmospheric Transport	J. V. Ramsdell, Subtask Leader K. W. Burk E. D. Skillingstad C. A. Simonen J. C. Simpson (Task 08)
0403	Groundwater Transport	M. D. Freshley, Subtask Leader P. D. Thorne
0404	Surface Water Transport	W. H. Walters, Subtask Leader S. B. Yabusaki M. C. Richmond

TASK 05: ENVIRONMENTAL MONITORING DATA

BACKGROUND

There is a relatively large body of historical documents and files containing environmental contamination data. Collection and evaluation of the data and publication of the data are important for the technical and public credibility of the project. These activities also provide information used in model validation.

SCOPE

Task 05 consists of three subtasks:

0501 Task Management

0502 Vegetation Data

0404 River Data Inventory.

TASK MANAGEMENT (0501)

Scope

This subtask includes the activities necessary to plan the work, coordinate internally and with the TSP and ensure that the work is carried out in accordance with approved plans. Reporting, recordkeeping and other administrative activities are also included, as is resolution of TSP and public comments on the draft Phase I reports.

Approach

Management and administrative procedures already in place for the project will be applied to manage this task.

Milestones to the TSP

- 20 • 0501A "Preliminary Summaries for Vegetation, River and Drinking Water and Fish Radionuclide Concentration Data" (finalization of *Phase I report*) (March 1991)

VEGETATION DATA (0502)

Scope

Data on the contamination of vegetation with iodine-131 and other radionuclides provides a means of partial validation for the overall HEDR project model. The inventory of contamination data for vegetation in

the Phase I study area will be extended through 1951. In addition, researchers will attempt to evaluate the recovered vegetation data and address questions related to the conversion of the raw data to concentrations of various radionuclides in the vegetation.

Approach

Additional vegetation data will be collected using the methods developed in Phase I. This includes review of historical routine weekly, monthly, and quarterly reports, investigation of archived log books, and other data searches.

Much of the historical data recovered are shown as raw counts per minute. Conversion of this type of data into concentrations of various radionuclides requires certain assumptions and calculations. Phase I estimates were made assuming that essentially all of the detected activity was radioiodine. This assumption will be evaluated using source term information (Task 03) about the relative emissions of radioiodine and other radionuclides.

A preliminary method was developed in Phase I for estimating the uncertainty distributions of the measured vegetation concentrations for a given geographic location. Additional historical and current literature reviews will be done to provide a more complete technical basis for making these estimations. This work will be coordinated with the Statistics Task (Task 08).

Milestones to the TSP

- 0502A report on vegetation data results, including revised estimates of vegetation concentrations and associated uncertainties (September 1991)

RIVER DATA INVENTORY (0404)

Scope

We will extend the previously completed inventory of water and biota contamination data and collect the documents containing the additional data. Specifically, this would create detailed inventories for 1945-1962, and 1967-1989 for DOE data and data from other agencies and extend the current detailed inventory for 1963-1966 to include non-DOE data sources. The inventories would cover the river from the Hanford Reach to the estuary. A summary of measurements would be prepared for inclusion into a interim project report putting the river pathway into perspective. (Subtask work is tracked and funded by Subtask 0404, Surface Water Transport, which is described in Task 04.)

Approach

Library searches and contacts with agencies will be made.

Milestones to the TSP

None. (The milestone for this work appears in Subtask 0404--Surface Water Transport--in Task 04.)

QUALITY ASSURANCE

The project QA plan will control task activities. Data extracted from reports will be identified as to the original source; data entry into databases will be verified and verification recorded. Calculation methods will be verified as correct, and results of calculations will be spot-checked. Quality assurance and control for the absorption measurements will be developed as part of the second subtask feasibility and planning effort for the experiment, if it is determined necessary.

INTERACTIONS

The work of the task will require support by the Information Resources task through the identification of historical documents and records. Statistics Task support will be required to complete the analysis of vegetation data uncertainty.

The results of this task will be data that can be used by the Environmental Transport and Environmental Pathways and Dose Estimates Tasks to compare to model outputs of environmental concentrations. Data produced by the task can also be made available to the public by the TSP through its public information activities.

ORGANIZATION

D. S. Barth, TSP
S. N. Davis, TSP

05	Environmental Monitoring Data	R. L. Dirkes, Task Leader
0501	Task Management	R. L. Dirkes, Subtask Leader
0502	Examine Phase I Assumptions for 1944-1947 Vegetation Data Reconstruction	R. L. Dirkes, Subtask Leader R. W. Hanf
0404	Extend River Data Inventory	R. L. Dirkes, Subtask Leader

TASK 06: DEMOGRAPHY, FOOD CONSUMPTION, AND AGRICULTURE

BACKGROUND

55

Task 06 is responsible for providing demographic, lifestyle, food consumption, food production, food distribution and other agricultural information needed to estimate radiation doses from past Hanford operations. Over the life of the project, this information is developed for the general population, Native Americans, *migrant workers*, and other special population groups included in the study.

During Phase I, information on demography, lifestyle, food consumption and food production and distribution was developed for the general population in the Phase I study area. This work was documented in three draft reports and used in Task 07 to develop the Phase I dose estimates. Work to develop population, food consumption and lifestyle information for Native Americans tribes was initiated, but has not yet been completed. This research is being carried out through contracts with each of the eight tribes in the vicinity of the Hanford Site.

During FY 1990, communications research was also conducted in this task. Two draft reports were prepared that documented the results of this research. In FY 1991, responsibility for communications research and other activities to support the TSP's communications program has been transferred to Task 12.

During FY 1991, draft Phase I reports need to be finalized and published; work to collect preliminary population, lifestyle and food consumption information for Native Americans needs to be completed; refinements need to be made to the milk model for the Phase I area; and information on milk systems outside the Phase I area needs to be collected to support selection of control groups by the HTDS.

SCOPE

Work required in FY 1991 will be carried out in three subtasks:

0601 Task Management

0602 Preliminary Population, Lifestyle and Food Consumption Data for Native Americans

0603 Milk Model Refinements and Additions.

A brief summary of the work to be carried out in each subtask is provided below.

TASK MANAGEMENT (0601)

Scope

This subtask includes the activities necessary to plan the work, coordinate internally and with the TSP and ensure that the work is carried out in accordance with approved plans. Routine reporting, record keeping and other administrative activities are also included. This subtask is also responsible for finalization of Phase I reports on population, food consumption and milk distribution.

Approach

Management and administrative procedures already in place for the project will be applied to manage this task.

Milestones to the TSP

- 20 • 0601A "Population Estimates for Phase I" (finalization of *Phase I report*) (March 1991)
- 20 • 0601B "Estimates of Food Consumption" (finalization of *Phase I report*) (March 1991)
- 20 • 0601C "Milk Cow Feed Intake and Milk Production and Distribution Estimates for Phase I" (finalization of *Phase I report*) (March 1991)

PRELIMINARY POPULATION, FOOD CONSUMPTION AND LIFESTYLE INFORMATION FOR NATIVE AMERICANS (0602)

Scope

Two tribes (*Couder d'Alene and Kalispel*) have completed collection of preliminary data needed to make Phase I dose estimates. The remaining preliminary data will be collected in this subtask through subcontracts with the tribes.

Approach

Data are being collected by the tribes under subcontract to PNL. HEDR staff will maintain close technical liaison with the tribes to assure they understand what data are needed and how they will be used. HEDR staff will assist tribal researchers in developing approaches and implementing these approaches when requested by tribes.

HEDR staff and outside consultants will review data submitted by tribes for consistency and completeness before the data are used to make preliminary dose estimates. Task 06 staff and Task 07 staff will determine how to incorporate Native American foods and lifestyles into the dose calculations. Data provided by the tribes will be prepared for input to the dose model. Task 07 staff will calculate preliminary dose estimates for each tribe that provides data (see Subtask 0602 in Task 07 for a description of work to estimate Native American doses).

Milestones to the TSP

None. (See Subtask 0602 in Task 07 for identification of milestones associated with Native American dose estimates.)

MILK MODEL REFINEMENTS AND ADDITIONS (0603)

Scope

Reviews of the Phase I milk model by the TSP and others identified several additional activities that were needed to ensure the completeness and accuracy of the model. These activities included use of additional experts to confirm estimates of market shares and distribution patterns, collection of additional information on the milk system in the two Oregon counties included in the Phase I area, and refinement of the models for Franklin and Adams counties to reflect data obtained after the report was published. This work will be completed and documented in an addendum to the Phase I milk model report.

Approach

The TSP Demography Subcommittee has helped HEDR staff identify an additional expert to use in estimating milk market shares and distribution patterns. This expert will be brought to PNL for a workshop similar to the one used with Dr. Gerald Ward to develop estimates provided in the draft Phase I report. Results of this workshop will be compared to the estimates provided in the original report. If significant differences are found in the two sets of estimates, a reconciliation process will be undertaken to enable the two experts to come to a consensus on the key estimates.

Additional information on the milk systems in Morrow, Umatilla, Franklin and Adams counties will be obtained using the interview procedures previously used to collect the original data summarized in the draft Phase I report.

Milestones to the TSP

- 0603A addendum to the Phase I milk model report (February 1991)

QUALITY ASSURANCE

The existing project QA procedures described in QAP OHE-3 will be applied to this work. Additional QA activities will be carried out in conjunction with the work in Subtask 0602 to collect preliminary Native American population, diet and lifestyle data. These data are preliminary and are being developed from primary data sources with limited resources. To ensure that they provide reasonable information upon which to base preliminary dose calculations, the data provided by the tribes will be reviewed by outside technical experts before they are incorporated into the dose models. The reviewers will be asked to examine the information for reasonableness of the estimates and consistency within the data provided. If these reviews identify any potential problems with using the data, HEDR staff will consult with the tribe providing the data to determine whether there are straightforward ways to resolve the problems. If there are no easy mechanisms to resolve the problem, we will recommend a meeting with representatives of the tribe, PNL and the TSP to determine how to proceed.

INTERACTIONS

Task 06 staff and outside technical experts will work closely with the Native American tribes to make sure that the tribal data are as complete and consistent as possible for use in dose estimation. Task 06 staff will work with external experts in refining the estimates of milk market shares and distribution patterns in the Phase I area. Native American data and milk distribution data for additional counties will be provided to Task 07 (Environmental Pathways and Dose Estimates) for dose estimation.

ORGANIZATION

TSP Demography Subcommittee R. L. Morrill, Chairman

06	Demography, Food Consumption and Agriculture	R. E. Rhoads, Task Leader
0601	Task Management	R. E. Rhoads, Subtask Leader
0602	Native American Data	C. L. Bruneau, Subtask Leader
0603	Milk Model Refinements	D. M. Beck, Subtask Leader

TASK 07: ENVIRONMENTAL PATHWAYS AND DOSE ESTIMATES

BACKGROUND

During Phase I, the feasibility of making retrospective dose estimates from Hanford radionuclide releases was demonstrated. The environmental pathways computer code used data provided by other HEDR task members to estimate the dose to "generic individuals" in the Phase I study area. This preliminary work identified some areas where enhancements in the computer code were needed. These areas will be addressed in Phase II. Documentation of the model and computer code began in Phase I, and will continue in Phase II. Additional dose estimates will be completed during Phase II as the necessary data become available.

SCOPE

The objective of this task is to estimate radiation doses to populations, typical individuals, and specific individuals. This work continues in Phase II with the estimation of tribal doses (Subtask 0602, using the Phase I dose model) and doses for the Hanford Thyroid Disease Study (HTDS) (Subtask 0703).

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During Phase I, much of the work in this task was devoted to developing a computer code that could perform the radiation dose calculations required by the HEDR Project. The improvement and refinement of this code continues through Phase II. In particular, the refinement of the air pathways code has been identified as a high-priority item to enable the stochastic nature of the modeling process to be adequately addressed. Also, the capability to estimate doses for a specific, rather than "generic," individual must be incorporated into the code. This work will take place in Subtask 0702. *At the end of Phase II, the code will have the capability to calculate dose estimates for individuals. This capability will initially be applied to generating individual dose estimates in support of the HTDS.*

Task 07 also ensures that the radiation dose estimates are as accurate as possible by using appropriate model parameters and through comparison to independent data. Evaluation and documentation of model parameters will take place in Subtask 0704. Model validation is not included as part of the FY 1991 Task 07 activities.

The scope of work for Task 07 in FY 1991 can be broken into the five subtasks shown below:

- 0701 Task Management
- 0702 Code Restructure and Analysis
- 0602 Tribal Doses
- 0703 HTDS Doses
- 0704 Model Parameters.

These subtasks are described in greater detail in the following sections.

TASK MANAGEMENT (0701)

Scope

Task management activities include integrating task activities to produce deliverables, integrating Task 07 activities with other HEDR tasks; controlling schedules and costs; interfacing with the TSP and HEDR Project management, including TSP meetings and travel; developing a Task 07 workplan; and planning and reviewing all task activities. In addition, this task will resolve TSP comments and finalize the draft report issued in Phase I, "Evaluation of Thyroid Radioactivity Measurement Data from Hanford Workers, 1944-1946."

Approach

Task management and control will be accomplished primarily through the system of project control initiated by Task 01 and other Battelle accounting systems already in place. The task manager will maintain contact with subtask leaders and staff members from this and other tasks to ensure that task and project milestones are met.

Milestones to the TSP

- 20 • 0701A "Evaluation of Thyroid Radioactivity Measurement Data from Hanford Workers, 1944-1946" (finalization of *Phase I report*) (March 1991)

CODE RESTRUCTURE AND ANALYSIS (0702)

There are two parts to this subtask: design specification support and development of the Phase II code.

Design Specification Support

Scope

This subtask will provide software engineering support in developing the design specifications of the restructured Phase II version of the HEDR Project air pathway code. This subtask is part of a coordinated effort with Task 02 (Project Technical Integration) and Task 08 (Statistics).

Approach

- 64 Factors to be considered in the design of the restructured air pathway code include accounting for proper correlations among model variables and between consecutive months of individual Monte Carlo dose calculations; direct calculation of cumulative doses; expanding the code to allow for more specific, individualized input; *developing a model that integrates actual release times and quantities into the air*

transport model (vs. the Phase I method of using monthly average releases); evaluation of the need for changes in the spacial nodes (including the possibility of using a rectangular grid); and efforts to make the restructured code more efficient, or to use other techniques to reduce the running time of the code (e.g. use of Latin Hypercube sampling to reduce the number of Monte Carlo samples needed to produce statistically adequate results).

Milestones to the TSP

None. (Milestones for this work appear under Subtask 0202--Code Design Specification--in Task 02.)

Development of Phase II Code

Scope

Provide computer time and software engineering, database, and programming support to develop, implement, test, and document a functional Phase II air pathway dose code. Again, this subtask is part of a coordinated effort with Task 02 (Project Technical Integration) and Task 08 (Statistics).

Approach

This task includes all software revisions to the current Phase I air pathway dose code. Revisions will be controlled and documented by existing PNL Software Control Procedures. Testing of the completed code will be performed using selected case studies, and the test results will be reviewed and analyzed by members of the Statistics Task to assure statistical integrity of the results. Arrangements will be made for a software QA review to be performed by an independent peer review group to assure that the code conforms to the design specifications for the restructured Phase II code.

Milestones to the TSP

- 0702A air pathway code documentation (September 1991)

TRIBAL DOSES (0602)

Scope

15 This subtask will complete all preliminary dose calculations for the eight Native American tribes involved in Phase I of the HEDR Project: *Coeur d'Alene, Kalispel, Yakima, Umatilla, Nez Perce, Colville, Spokane, and Warm Springs tribes. The locations studied are the tribal reservations during the time periods and for the radionuclides studied in Phase I of the project.*

Approach

This subtask will use the existing Phase I code to calculate the preliminary Native American doses. Completion of this subtask is dependent upon receiving Native American lifestyle survey results from tribes. Collection of data is coordinated through Task 06 (Demographics, Agriculture, Food Habits). *Doses have already been estimated for the two tribes that have already provided data (Coeur d'Alene and Kalispel); additional calculations will be performed as data become available.*

Milestones to the TSP

- 0602A dose estimates for two tribes that provided data in FY 1990 (December 1990)
- 0602B dose estimates for remaining six tribes (March 1991)

HTDS DOSES (0703)

Scope

- 66-1 This subtask will calculate doses for *a minimum of* approximately 450 individuals in the pilot phase of the HTDS. Data will be provided by the Fred Hutchinson Cancer Research Center (FHCRC) as part of that study.

Approach

- 21, *Dose estimates for individuals in the HTDS pilot study, along with characterizations of the uncertainty*
66-2, *of those estimates (model, data, and parametric uncertainties), will be calculated using the Phase II code and*
66-3 *will be delivered to HTDS on magnetic media.* This subtask is therefore dependent upon the progress of subtask 0702 (Code Restructure and Analysis). Calculation of pilot-study doses is also dependent upon receiving the appropriate data from FHCRC. Because of these uncertainties, subtask work may extend into FY 1992. *Since these dose estimates are calculated for the use of the HTDS, no report that lists, summarizes, or otherwise presents information about the dose estimates will be prepared by HEDR.*

Milestones to the TSP

- 66-4 • 0703A dose estimates *and uncertainties* for individuals in the HTDS pilot study *on electronic media (tentatively, September 1991)*

MODEL PARAMETERS (0704)

This subtask has two parts: developing iodine transfer factors and documenting age-dependent dose factors. Initiation of this task has been delayed for six months and is contingent upon TSP approval.

Iodine Transfer Factors

Scope

This subtask will compile, evaluate, and document the radioiodine model parameters used in the preliminary Phase I dose estimates. An option is to extend this task beyond iodine to ruthenium or other dominant radionuclides. This would require additional funding and extension into FY 1992.

Approach

This work would include a review of available literature on iodine transfer factors and an evaluation to determine the correctness and appropriateness of their use.

Age-Dependent Dose Factors

Scope

The primary objective of this subtask would be to document age-dependent dose factors for ages from infant to adult. Depending on funding and staff availability, work may also include developing time-dependent prenatal dose factors for radioiodines.

Approach

72, 74 ICRP Publication 56 is expected to be the primary source of information on age-dependent dose factors. Work on prenatal dose factors would include an evaluation of existing, conflicting models on prenatal transfer of radioiodine.

Milestones to the TSP

- 70 • 0704A a draft report documenting model parameters, including iodine transfer factors and radioiodine age-dependent dose factors, *including discussion or listing of used and unused data* (September 1991)

QUALITY ASSURANCE

All work under this task will be performed in accordance with QA requirements outlined in the project Quality Assurance Plan. In addition, work performed under subtasks 0702, 0602, and 0703 will include applicable quality assurance/data verification activities outlined in existing PNL Software Control Procedures (SCPs). Subtask 0702 will use SCPs for software configuration management during development to provide for adequate design documentation and change control. A code Final Internal Development Review will be performed before calculations for specific members of the public are released. Dose calculations performed under subtasks 0602 and 0703 will control and document dose calculations using SCPs for software application control.

INTERACTIONS

All of the subtasks within this task will require interaction with Task 02 (Project Technical Integration). In addition, subtasks 0702, 0703, and 0602 will require interface with Task 08 (Statistics). Tribal dose calculations (0602) are funded by and require data input from Task 06 (Demography, Food Consumption and Agriculture).

ORGANIZATION

B. Shleien, TSP
K. J. Kopecky, TSP

07	Environmental Pathways and Dose Estimates	T. A. Ikenberry, Task Manager
0701	Task Management	T. A. Ikenberry, Subtask Manager B. Kallsen, Secretary
0702	Code Restructure and Analysis	R. A. Burnett, Subtask Manager J. C. Simpson (Task 08) B. A. Napier (Task 02) Programmer, TBD
0602	Tribal Doses	T. A. Ikenberry, Subtask Manager R. A. Burnett Programmer, TBD J. C. Simpson (Task 08) B. A. Napier (Task 02)
0703	HTDS Doses	T. A. Ikenberry, Subtask Manager R. A. Burnett Programmer, TBD J. C. Simpson (Task 08) B. A. Napier (Task 02)
0704	Model Parameters	T. A. Ikenberry, Subtask Manager J. K. Soldat B. A. Napier (Task 02)

TASK 08: STATISTICS

BACKGROUND

It is well known that the radiation doses individuals received from radioactive air and water emissions from Hanford since 1944 cannot be reconstructed with complete certainty. The purpose of the Statistics Task is to use uncertainty/sensitivity analysis methods to quantify these uncertainties and to provide statistical assistance to other HEDR Project technical tasks.

Recent computer simulation studies conducted by the Statistics Task indicate that changes are needed in Phase I dose/uncertainty estimation methods to obtain defensible final estimates of doses and their uncertainties. In particular, it is now known that the Phase I modular computer code tended to yield estimates of doses and uncertainties that were biased high, particularly in low-dose areas near the boundaries of the 10-county study area to the west of Hanford. Also, preliminary sensitivity analyses indicate that uncertainty in the atmospheric dispersion of radionuclides is the largest contributor to dose uncertainties. In Phase II, the Statistics Task will play a central role in addressing these and other problems so that defensible dose/uncertainty estimates will be obtained.

SCOPE

Task 08 is divided into four subtasks:

- 0801 Task Management
- 0202 Dose Code Revisions
- 0402 Sensitivity/Uncertainty of Air Model
- 0802 Task Assistance.

TASK MANAGEMENT (0801)

Scope

The Statistics Task manager will conduct the following activities: 1) fully integrate the Statistics Task into the HEDR Project to ensure that all subtasks are appropriately using statistics, 2) ensure that effective communication is maintained with Ken Kopecky of the TSP to develop work plans, review results, and prepare presentations and papers, 3) ensure Statistics Task subtasks are completed on schedule using applicable QA procedures and documentation, and 4) prepare budgets, write monthly reports, and maintain effective communication with the HEDR Project manager.

Approach

Task management will be accomplished through coordination with other project technical tasks and the TSP, using established project procedures.

Milestones to the TSP

None.

DOSE CODE REVISIONS (0202)

Scope

The purpose of this subtask is to conduct bench-scale sensitivity/uncertainty analyses on the Phase I dose code and on candidate, small-scale Phase II dose codes to develop a defensible computational structure for estimating doses and their uncertainties for specific individuals in the 10-county study area used in Phase I. This work is tracked and funded by Task 02 (Technical Integration).

Approach

77 Alternative model code implementation structures will be examined via bench-scale computer simulation sensitivity analyses to develop a final structure that retains needed correlation information among model parameters and pathways. *In other words, the revised dose model will maintain relationships among time, location, and amount of material released and transported. For example, as modeled, wind blowing in one direction will carry materials in that direction, not in another direction at the same time. This is an improvement over the Phase I model, which used random sampling of one module as input to the next one, sometimes resulting in non-realistic modeled distributions of radioactive materials (such as materials being carried in opposite directions at once).*

As new knowledge is gained, the model will be refined and bench-scale simulations will be repeated until the structure is in its final form. The developed structure will be capable of properly incorporating correlations among model parameters as well as uncertainties in model parameters caused by lack of knowledge and stochastic processes.

Milestones to the TSP

- 76
- 0202C report on effects of loss of model correlations on dose estimates (*January 1991*)

SENSITIVITY/UNCERTAINTY OF AIR MODEL (0402)

Scope

Bench-scale sensitivity and uncertainty analyses of the air model will be conducted to develop a defensible parameterization of air model results for input into the dose code. This work, which *contributes to* Task 04 (Environmental Transport), will focus on evaluating the sensitivity of model results to critical parameters. The final parameterization and computational structure will provide defensible stochastic realizations of air model outputs to the dose code.

Approach

The Phase I dose results were obtained by averaging atmospheric model results for all grid nodes in or near each census division for monthly time periods. This approach is now known to result in inflated doses and uncertainties for mountainous (or hilly) census divisions to the west of Hanford. In addition, this approach can produce realizations of air model outputs that are unrealistic. *An analysis of air model variability will be conducted to explain in more technical detail the problems and effects associated with the Phase I air model.*

This subtask will *also* conduct bench-scale sensitivity/uncertainty analyses to determine a temporal/spacial estimation scale that will yield defensible estimates of doses and their uncertainties, even for large census divisions that include mountainous terrain. *This work contributes to Milestone 0402C, report on sensitivity/uncertainty of air model, which is shown in Task 04.*

Milestone to the TSP

- 0402D report on air model variability (March 1991)

TASK ASSISTANCE (0802)

Scope

This subtask will provide leadership and assistance to HEDR Project technical tasks on statistical methods to ensure that appropriate statistical procedures are used throughout the project. An important activity of this subtask will be to help tasks identify when statistical and sensitivity analyses are needed and how to conduct them. Other activities are likely to include 1) helping to describe, summarize, and statistically analyze environmental measurements, and 2) analyzing measurements to help validate the dose models.

Approach

Statistics Task staff will consult on a regular basis with other HEDR Project tasks to provide statistical design, analysis and interpretation assistance. The Statistics Task will also review reports written by other tasks to assure that the statistical methods have been properly described, used, and interpreted.

Milestones to the TSP

None.

QUALITY ASSURANCE

The quality of bench-scale sensitivity analyses will be assured and reported via the following activities:

- written documentation of purpose of the bench-scale computer simulation codes; mathematical, statistical, and simulation methods used in the codes; citations of references of methods; simulation procedures and results; and conclusions derived from the studies
- hard copy and computer logs of all computer runs
- backup copies of all codes and results on computer disk or tape
- peer review of reports and presentations before being finalized or presented.

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The Statistics Task will maintain, *in HEDR Project files*, notes of meetings with other technical tasks as regards purpose, scope of discussions, recommendations/decisions made, and future action required. In addition, records will be kept of the purpose, methods, results and interpretations of statistical analyses. If computer software is developed, the QA requirements of PNL as described in the HEDR Project quality assurance plan will be used. Any reports that are written will receive peer review.

INTERACTIONS

The success of Subtask 0802 will require close interaction on a regular basis with Task 02 (Technical Integration). The close working relationship between Tasks 02 and 08 that was established during Phase I will be maintained and strengthened. Interactions with other technical tasks will also be strengthened by frequent meetings to ensure the work continues along the right path. Communications with Ken Kopecky of the TSP will be maintained to ensure compliance with TSP direction.

The underlying purpose of Subtask 0804 is to develop and maintain relationships with staff of other HEDR Project technical tasks. The Statistics Task sees itself as a resource to other tasks and as a force for coordinating statistical activities across the project. Hence, the establishment of relationships is vital to the success of this subtask. This will be done via a regular meeting/phone schedule to identify needs, check progress, and advise on future direction of analyses.

ORGANIZATION

K. J. Kopecky, TSP

08	Statistics	R. O. Gilbert, Task Leader
0801	Task Management	R. O. Gilbert, Subtask Leader
0202	Dose Code Revisions	J. C. Simpson, Subtask Leader T. B. Miley R. O. Gilbert
0402	Sensitivity/Uncertainty for Air Model	J. C. Simpson, Subtask Leader T. B. Miley R. O. Gilbert
0802	Task Assistance	R. O. Gilbert, Subtask Leader J. C. Simpson T. B. Miley

TASK 09: RECORDS MANAGEMENT

BACKGROUND

The records management task ensures that project records are organized and managed in accordance with approved PNL procedures. This includes determining that the records meet legal, regulatory, and QA requirements.

SCOPE

Records Management provides storage and control of completed project records, inspects the records to verify they meet QA requirements, maintains an automated inventory of project records, and provides reference service to project staff and the TSP. This task ensures that project records are organized and managed according to approved procedures to meet legal, regulatory, and QA requirements. Records Management also provides technical assistance, training, personnel, facilities, and services to ensure that these objectives are met.

APPROACH

Project records are accumulated and transferred to the PNL Records Center at periodic intervals. As records are received at the PNL Records Center, they are inspected to verify that they meet QA requirements for a completed record. Information from each document is entered into a computer using spreadsheet software. A computer inventory is produced and verified to assure that all records are accounted for. A copy of the computer inventory and a signed transmittal form is returned to the project office as a receipt for the records.

The Records Management Task stores completed project records in the PNL Records Center and transmits copies of approved records to the DOE-RL Public Reading Room located in the Richland Federal Building.

MILESTONES TO THE TSP

79, 10

Records management work, such as number of project records processed and transferred to the DOE-RL Public Reading Room, is documented in the HEDR monthly report, which the TSP receives.

QUALITY ASSURANCE

The following procedures have been issued that apply to this task. No other procedures are expected to be developed.

- RMP-1, HEDR Records Control
- RMP-2, Storage and Maintenance of HEDR Project Records.

The Records Management Task maintains and controls the quality records that have been transferred to the PNL Records Center. Quality records generated by Records Management are immediately transferred to the project office for inclusion in the project files.

INTERACTIONS

Records Management deals primarily with the project office and the DOE-RL Public Reading Room for records transmittals. Also, Records Management provides technical assistance, training, and reference service to project staff as requested.

ORGANIZATION

09 Records Management

W. A. Bishop, TSP

D. L. Alamia, Task Leader
D. K. Hanson
D. L. Burk
J. K. Hays

TASK 10: QUALITY ASSURANCE

BACKGROUND

PNL's QA program is based on ANSI/ASME NQA-1, "Quality Assurance Program Requirements for Nuclear Facilities," as it is applicable to the research and development services performed by PNL. This QA program provides for conducting activities in a planned and controlled manner and verifying the quality of end results. The QA requirements applicable to Phase II will be identified in a QA Project Plan, OHE-3.

Quality assurance is recognized at PNL as an interdisciplinary function involving all the organizational components. The project manager has the overall responsibility for implementation of the QA requirements identified in the QA plan. Project staff are responsible for meeting the requirements applicable to their individual contributions to the project. The task leader, who reports to the Process Quality Department, is assigned to support the HEDR Project in assisting project staff in implementing the QA program requirements.

SCOPE

The objectives of the Quality Assurance Task are to ensure continuous QA support and coordination with all project tasks. The task leader will provide QA program implementation support.

Subtasks include

- QA function, including participating in the development of project QA planning
- providing quality assurance guidance to project staff to assist staff in developing quality objectives and meeting applicable QA requirements
- audits, including performing quality verification activities (surveillance) to assure control of activities and compliance with QA program requirements throughout the duration of the project
- QA plan
- working with TSP QA

APPROACH

- Per TSP Directive 89-9, develop a QA Plan that identifies project specific data quality objectives (DQO) and methods for achieving them. This will be accomplished in two steps:
 - 1) Prepare a set of guidelines that set forth the minimum adequate contents for achieving DQOs. Where possible, quantitative DQOs will be developed but the emphasis will be on developing qualitative DQOs.
 - 2) With input from technical staff, prepare data quality objectives (DQO) for phase II activities and *incorporate into the mid-year revision of this project plan.*

- Provide quality assurance guidance to project staff in areas of procedure implementation guidance/interpretation, resolving QA problems, QA training, document reviews (procedures, reports), and processing deficiencies.
- Perform quality verification activities (surveillances) to assure control of activities and compliance with QA program requirements. At a minimum, surveillances will be performed in the following areas:
 - software control (model verification, data base control, etc.)
 - hand calculations
 - project records control
 - training
 - data traceability of results
 - compliance to established DQOs
 - documentation of internal/external peer reviews.
- Arrange for an internal audit to be performed on project technical and administrative QA activities.

MILESTONES TO THE TSP

- 10A Phase II QA Plan (January 1991)
- 10B internal audit report (September 1991)

QUALITY ASSURANCE

Quality assurance activities are addressed by each technical task and requirements contained in the project QA plan.

INTERACTIONS

The task leader will coordinate with other project staff to ensure that all staff are working to the same requirements. This is accomplished through the identification and documentation of QA requirements in a QA plan and through periodic monitoring of project activities during the life of the project.

ORGANIZATION

TSP Quality Assurance Working Group
W. A. Bishop, Chairman
D. S. Barth

12 Quality Assurance

R. Cuello, Task Leader

TASK 11: INFORMATION RESOURCES

BACKGROUND

This task provides for identification, collection, organization and declassification of literature generated at the Hanford Site for project use and public information.

SCOPE

Information Resources will have three ongoing activities during FY 1991: 1) task management, 2) declassification of Hanford Site documents to meet HEDR needs, those of the TSP and the public, and 3) identification of Hanford documents to meet HEDR needs and provision of those of potential interest/use to the public. Task 11 subtasks are called

1101 Task Management

1102 Declassification

1103 Resources Identification and Availability.

Task Management (1101)

Scope

This subtask will provide for preparation of budgeting and planning documents, preparation of monthly reports and attendance at TSP and project meetings, and other offsite travel. Programming modifications to the database will be added as needed. Normal services for duplicating, office supplies and miscellaneous procurements are included in this subtask.

Approach

Project and task procedures will be used to manage the task.

Milestones to the TSP

None.

Declassification (1102)

Scope

This subtask is responsible for declassifying documents of potential use to the HEDR Project, as identified by the TSP or HEDR staff.

Approach

Almost all Hanford Site documents were "born classified" until at least 1950. A significant number remain classified because they contain some production-related information or classified specifications and technology. Because only unclassified/declassified information is used to develop source terms, numerous documents have been declassified on a case-by-case basis as specific needs for their use are identified.

During the last half of FY 1990, nearly 11,000 Hanford Site documents generated between the years 1944-1960 that are currently classified as SECRET or CONFIDENTIAL were identified and input into a database using dBase III plus software. Copies of the database were supplied to all TSP members and deposited in the DOE-RL Public Reading Room. The TSP has identified about 10% of the documents as relevant to HEDR, TSP and Public interest and/or use. This collection of approximately 1,100 documents will be prioritized and submitted to this subtask for review for declassification either with or without deletions. The declassified documents will be provided to appropriate HEDR tasks and the TSP and deposited in the DOE-RL Public Reading Room.

In mid FY 1991, the cost of declassification will almost double when DOE Order 5650.2B becomes effective and requires a two-person review for each declassification action.

Milestones to the TSP

79, 10

Information Resources work in this subtask is documented in the HEDR monthly report, which the TSP receives.

Resources Identification and Availability (1103)

Scope

This subtask provides for the continued maintenance and updating of the HEDR Information Resources Tracking System (HIRTS) database. Each document of potential interest and/or use to the project is publicly released and placed in the DOE-RL Public Reading Room.

As specific needs of the technical tasks are identified or expressed, this subtask searches available resources for significant documents, directs them to task leaders and the TSP and deposits them in the DOE-RL Public Reading Room. Efforts to identify additional significant documents on key dominant radionuclides will continue.

Approach

HIRTS was established for collecting and retrieving existing historical documents. This microcomputer-based system uses a spreadsheet software package for input and another software package (called AskSam) for information retrieval purposes. AskSam has the capability for truncation and Boolean logic, i.e., it can search on the root of a work and combine it with other words, authors, dates, etc. As the

database increases in size, this logic specificity becomes more necessary and useful. At the end of FY 1990, the database contained more than 3,700 citations. As additional documents are identified they will be added to HIRTS, directed to appropriate HEDR Tasks, and placed in the DOE-RL Public Reading Room.

Milestones to the TSP

79, 10 *Information Resources work in this subtask is documented in the HEDR monthly report, which the TSP receives.*

QUALITY ASSURANCE

Information Resources is identified as Impact Level III and will comply with the PNL Good Practices Standard that is in Part II of PNL-MA-70.

INTERACTIONS

Information Resources identifies and collects documents of potential use to other tasks to meet their technical objectives. For example, documents addressing ruthenium releases will be supplied to Task 03 to aid them in developing ruthenium source terms.

ORGANIZATION

N. J. Germond, TSP (Declassification only)

11	Information Resources	S. P. Gydesen, Task Leader
1101	Task Management	S. P. Gydesen, Subtask Leader N. G. Carter R. K. Jahnel
1102	Declassification	S. P. Gydesen, Subtask Leader
1103	Resources Identification and Availability	S. P. Gydesen, Subtask Leader P. M. Cleavenger

TASK 12: TSP COMMUNICATIONS SUPPORT

BACKGROUND

The TSP Communications Support Task provides an essential element to the HEDR Project mission. An aggressive public outreach program was identified as a basic, integral component by the TSP and implemented early in the project. The TSP recognized at the outset of the project that the results would be meaningless unless the public perceived them as being credible, objective and unbiased. The TSP Communications Subcommittee is responsible for fulfilling that objective by seeking, hearing and responding to public concerns, and providing the public with information about project progress, results and achievements. The key objective is to provide the public with all necessary communication elements to enhance understanding and encourage involvement in the decision-making process. The goal of the TSP Communications Support Task is to support the TSP in reaching that objective.

SCOPE

Task staff assist the TSP Communications Subcommittee in the following activities: developing communications strategies to effectively communicate technical information to the public and to identify and address public concerns; establishing public information mailing lists; working with local, regional and national news media to provide project information; developing fact sheets on topics of interest; making project-related documents publicly accessible; and conducting public meetings to present project progress and receive and respond to public comments.

The work is divided into five subtasks:

1201 Task Management

1202 Video

1203 Public Opinion Survey

1204 TSP Communications Subcommittee Support

85,91 1205 *TSP Database and Audio-Visual Support.*

Development of an informational display on the project has also been requested by the TSP Communications Subcommittee, but this activity is currently unfunded. *Battelle* will request the allocation of necessary funds from FY 1991 contingency funds to develop a display.

TASK MANAGEMENT (1201)

Scope

This subtask involves development and management of communications activities in support of the TSP and its Communications Subcommittee. Included in this task are planning and budgeting; monthly

reporting; attendance at task leader, TSP and Communications Subcommittee meetings; responding to information requests by the public, media and other audiences; and resolving TSP and public comments on the draft Phase I reports. This subtask also provides routine media relations support to the TSP and project management and provides news articles about the project to TSP members, project management and the DOE-RL Public Reading Room.

Approach

Task management requires regular involvement with TSP Communications Subcommittee members, project personnel, Battelle management, and other TSP, Project management and task components.

Milestones to the TSP

- 20 • 1201A "A Preliminary Examination of Audience-Related Communications Issues: Hanford Environmental Dose Reconstruction Project" (finalization of *Phase I report*) (March 1991)
- 20 • 1201B "Summary of Literature Review of Risk Communication" (finalization of *Phase I report*) (March 1991)

VIDEO (1202)

Scope

- 86, 97 A videotape will be produced to help communicate correct, specific, and consistent information about the project to general audiences. Copies of the tape will be distributed or loaned to audiences such as libraries, schools, and public interest and civic groups. The tape could be used as a stand-alone information piece, but will most likely be used as part of an informational presentation. *Production costs of the video tape will be estimated. An RFP may be prepared to determine the lowest cost/highest quality production. Lead criterion for a quality video is that it be a product that can be used for the life of the project. If this criterion cannot be met, the display will be a priority.*

Approach

With TSP Communications Subcommittee review and direction, HEDR and other Battelle staff will write and produce a short (8-12 minute) videotape outlining the project's purpose, goals, objectives, schedule, structure, the role of the TSP, and encouragement of public involvement.

The production of videotape materials using government funds is governed by DOE Order 1350.1. Generally, this order requires that DOE Headquarters give prior approval to the cost, concept and content of all audiovisual materials. However, because of the special relationship between the DOE and the project, it is likely this order will be waived, on an as-requested basis, to include only review of the costs to ensure government funds are expended wisely.

Milestones to the TSP

- 1202A videotape workplan (December 1990)
- 87,88 • 1202B master and duplicate copies of videotape (July 1991)

PUBLIC OPINION SURVEY (1203)

Scope

International press coverage was given to the preliminary findings included in the Phase I reports released July 12, 1990. This information, reported both accurately and inaccurately, helped shape opinions and attitudes of the public. To ensure that the TSP's communications efforts are effective, and to ensure that the TSP is aware of public attitudes and concerns, a public opinion survey will be conducted.

- 89 Once understood, the information from the survey can be used to develop in a more cost-effective plan to better identify and develop methods to inform, educate and communicate with the public, as well as a better understanding of issues and concerns. *The survey will help the TSP be more flexible in meeting the public's information needs. It is important to evaluate the effectiveness of methods used now. The survey is another tool to aid the Communications Subcommittee in this evaluation.*

Approach

The survey will be conducted using standard random sampling techniques to obtain a representative sample of the regional population. It will also build on a previous survey of public attitudes, which contained questions about the project and was conducted in the Spring of 1990--the Washington State University (WSU) Omnibus Survey. The purpose of the FY 1991 survey is to attempt to assess any change in knowledge, concerns and attitudes among Washington and Oregon residents about the project as a result of the release of preliminary results in July 1990. The survey will also be used to develop a broader baseline of information in preparation for any future surveys.

Specific goals for the survey are yet to be outlined by the TSP Communications Subcommittee. Items may include determining the effectiveness of communications activities to date and identifying any new issues of concern on the part of a cross section of the public. To defray costs, the TSP Communications Subcommittee is exploring options for having various groups or organizations share in costs of conducting the survey.

The results of the survey will be an integral part of information needed for FY 1992 and Phase III planning for communications activities. It is important for data to have been collected and analyzed early in the second half of FY 1991.

Milestones to the TSP

- 1203A letter reports to the TSP Communications Subcommittee on results of the public opinion survey (June 1991)

TSP COMMUNICATIONS SUBCOMMITTEE SUPPORT (1204)

Scope

Routine assistance will be provided to the TSP Communications Subcommittee to accomplish specific tasks and on an as-needed basis. This includes providing professional counsel and assisting the Subcommittee in analyzing potential audiences and determining their informational needs, as well as developing communication strategies to meet those needs.

Approach

Support activities include assistance in developing and interpreting an accurate audience analysis, developing and implementing communications strategies, providing miscellaneous subcommittee support (e.g., supplying photos, graphics, information and other materials), assisting with the preparation of public meetings and presentations (e.g., questions and answers, logistical support and arrangements), and providing review and comment on fact sheets, reports and written materials.

Milestones to the TSP

None.

91 TSP DATABASE AND AUDIO-VISUAL SUPPORT (1205)

Scope

The purpose of this subtask is to provide a computer to the State of Washington for use on the HEDR Project to conduct word processing and database management activities and to provide audio-visual support during TSP Public meetings.

Approach

Battelle will provide a computer to the Washington Department of Ecology. Audiovisual support will be provided at the January, April, July, and September TSP meetings and at four yet-to-be determined public meetings.

Milestones to the TSP

- 1205A computer for Washington Department of Ecology (January 1991)

QUALITY ASSURANCE

93 Generally accepted QA practices will be applied to all activities by the task leader, Project Manager, *Chair* of the TSP Communications Subcommittee and Battelle management.

INTERACTIONS

Task 12 staff work with the TSP Communications Subcommittee to receive specific direction on all activities, to provide professional counsel and present options and recommendations for communication activities, and to report progress. In addition to ongoing discussion with Communication Subcommittee members, the following coordinations also occur on specific activities. In producing the video for TSP use, Task 12 staff work with other Battelle and Boeing Computer Services, Inc. staff (e.g., artists, photographers, videographers). In conducting the public opinion survey, Task 12 staff work with *one or more* subcontractors and survey respondents as appropriate. Other interactions are with the media in support of TSP public meetings and with the general public, interested individuals and groups. Other interactions are with the Washington State Department of Ecology in the provision of a computer system and audiovisual support for TSP meetings.

ORGANIZATION

TSP Communications Subcommittee M. L. Blazek, Chair

93

12	TSP Communications Support	G. L. Harvey, Task Leader
1201	Task Management	G. L. Harvey, Subtask Leader
1202	Video	G. L. Harvey, Subtask Leader
1203	Public Opinion Survey	C. W. Holmes, Subtask Leader
1204	TSP Communications Subcommittee Support	G. L. Harvey, Subtask Leader T. A. Nelson A. H. McMakin
85	1205 <i>TSP Database and Audio-Visual Support</i>	G. L. Harvey, Subtask Leader T. A. Nelson

APPENDIX

SUMMARY OF TSP COMMENTS AND BATTELLE RESPONSES

HEDR DOCUMENT REVIEW RECORD

Document Title FY 1991 HEDR Project Plan

Document Number PNL-7563 HEDR

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
1.	Kopecky	Page 1.1, para. 2	Last sentence: Revise as ". . . and for individuals included in the pilot phase of the Hanford Thyroid Disease Study."	Revised.
2.	Kopecky	Page 1.1, bullets 3, 4	Delete "need for."	Revised.
3.	Caldwell	Page 2.1, Approach, line 1	"status" is out of place or needs a modifier.	Deleted.
4.	Caldwell	Page 2.2, para. 1, line 3	Replace "costed" with "costs estimated."	Revised.
5.	Caldwell	Page 2.2, para. 1, lines 6-8	"statuting" is not a word.	Revised.
6.	?	Page 2.2, para. 2, line 1	Omit "in . . . characterized" and change "various" to "the."	Revised.
7.	?	Page 2.2, para. 2, line 1	Change "occurring in" to "during."	Revised.
NA = No action.				

HEDR DOCUMENT REVIEW RECORD

Document Number PNL-7563 HEDR Document Title FY 1991 HEDR Project Plan

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
8.	Till	Page iv	Clearly state the overall objective of Phase II. It must be the objective that by the end of Phase II we have the <u>models in place and documented</u> for making dose estimates in Phase III.	FY 1992 (Phase II) objective; text revised to clarify.
9.	Till		Add for each milestone whether the task will be completed during the FY or will overlap into the next FY (and still be completed in Phase II).	NA - they are all completed in FY 1991; this is a FY 1991 project plan.
10.	Till	Page 2.5	Everywhere possible, tasks should have a deliverable. This may simply be a report at the end of the year describing what has been accomplished. Monthly reports are a deliverable. Obviously items like peer review and subcontract administration will not have deliverables.	See Tasks 09 and 11 for clarification.
11.	Barth		A principal purpose for determining the variability or uncertainty in each task's results is to enable a determination of the overall variability or uncertainty in estimated doses. Since the estimated doses are functions of the models used and all input parameters, it appears that the TSP may not see any quality assured dose estimates in FY91. Further discussion between PNL and the TSP is necessary on this matter.	NA - quality objectives are being added to project plan at mid-year. Uncertainties will be continuously defined and reduced as part of task work.
VA = No action.				

HEDR DOCUMENT REVIEW RECORD

Document Number PNL-7563_HEDR Document Title FY 1991 HEDR Project Plan

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
12.	Barth	Page iv	Project Overview: The determination of accuracy (level of uncertainty in dose estimates) is a primary objective of Phase II. This important aspect should be accorded a high priority and not be postponed until FY92.	NA - true - first half of FY 1992 is part of Phase II. Current TSP budget limits activities in FY 1991. Could commit contingency funds to this area.
13.	Barth	Page iv	Model and Data Evaluation Activities: Why conduct sensitivity and uncertainty analyses only on the air dispersion model? There are also possible major sources of variability in transferring factors and other parameters used in converting air concentrations of radioiodine, for example, into thyroid dose estimates.	NA - these activities were placed on hold by the TSP until mid-year.
14.	Roessler	Page iii, bullet 4	Further explain how the iodine-131 estimates will be finalized.	NA - see p. 4.2.
15.	Barth	Page v	Additional Dose Estimates: In the estimation of doses for eight Native American tribes in the vicinity of the Phase I study area, what specific locations are involved, what time periods, and what radionuclides?	More detail provided under Section 0602, Tribal Doses. This discussion appears under Task 07 (not 06).
16.	Roessler	Page vi	Several new task managers are shown. The TSP should be advised as to why these changes were made and assured that the changes will not affect the project adversely.	Advised.
NA = No action.				

HEDR DOCUMENT REVIEW RECORD

Document Number PNL-7563 HEDR Document Title FY 1991 HEDR Project Plan

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
17.	Till	Pages vi-vii	Add a footnote that dollars indicated are for technical work and do or do not include Battelle overhead.	Addressed in Table 1 footnote.
18.	Barth	Page ix, Fig. 2, Milestones	Milestone 0101B is scheduled for August 1, 1991. How can PNL proceed productively between now and then in the absence of an integrated project plan?	See discussion of project planning under Project Control (0101) section.
19.	Roessler	Page x	Suggest switching time line for 0403C and 0502A.	No. Task leaders say both milestone schedules are realistic.
20.	Till	Page x	Milestones should denote (by symbol) whether or not a report is a finalization of an earlier document or a new report. Specify in the work plan descriptions as well.	Explained on p. v and in list of milestones in each task description.
21.	Barth	Page xi, Fig. 2, Milestones	Milestone 0703A is scheduled for October 1, 1991. Will these HTDS doses include uncertainties and if so, what will be the basis for these uncertainties?	Model, data, and parametric uncertainties will be included; see p. 8.4.
22.	Till	Page 1.1	The objective of Phase II must include developing the tools needed to carry out the dose assessment. We must be in a position to do this at the end of Phase II.	Addressed on p. 1.1.
NA = No action.				

HEDR DOCUMENT REVIEW RECORD

Document Title FY 1991 HEDR Project Plan

Document Number PNL-7563 HEDR

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
23.	Roessler	Page 1.1, para. 2	Last sentence seems like the most important part and should go first.	NA - cannot do HTDS doses without revised model - tribal doses are too late in year.
24.	Roessler	Page 1.1	Examples of work that may be added or postponed include at least two items--vegetation data and age dependent transfer factors--and possibly the Tribes--that I would give high priority for, and the terminology "may be added or postponed" does not indicate any degree of priority. I hope it is written this way because Battelle is waiting for the TSP to better define priorities.	NA - true. Vegetation data work authorized on January 11, 1991 by TSP. Also, Battelle/TSP planning will focus attention on priorities, schedules, and budgets.
25.	Barth	Page 1.1	The collection of vegetation data for use in model validation is of the highest priority and should proceed immediately.	TSP authorized this work to proceed. Item was deleted from list of activities to be added or postponed.
26.	Barth	Page 1.1, bullet 4	Further need for uncertainty and sensitivity analyses is a high priority question and should not be postponed.	NA - Battelle proposed this work in FY 1991 - TSP reduced priority.
27.	Shleien	Page ix	Graph and information for Battelle does not reflect monies transferred from FY 1990 budget. Dollar amounts for each task should be included throughout the work plan.	Footnote (c) in Figure 2 identifies FY 1990 carryover. Dollar amounts for each task shown in Table 1.
	NA = No action.			

HEDR DOCUMENT REVIEW RECORD

Document Number PNL-7563 HEDR Document Title FY 1991 HEDR Project Plan

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
28.	?	Page 2.3	"Milestones to the TSP" indicated only the summary, air, and river Phase I reports will be re-released. State the disposition of the other Phase I reports.	NA - see last two sentences under "scope." "Supporting" Phase I reports are shown as milestones under the appropriate technical tasks.
29.	Roessler	Page 3.2, para. 1	"Involved daily" implies a full-time effort by the task manager. This cannot be achieved if this task manager is diverted to other Battelle priorities.	NA - the task manager is committed to >90% of his time.
30.	Till	Page 3.2	Milestones to the TSP: The end product of this task must be the code, not the code specifications.	NA - included in Task 07.
31.	Barth, Bishop	Page 3.3, QA	Include a discussion of the development of data QA objectives for Subtask 0201.	NA - data quality objectives are being developed and will be included in the mid-year revision of the plan.
NA = No action.				

HEDR DOCUMENT REVIEW RECORD

Document Number PNL-7563 HEDR Document Title FY 1991 HEDR Project Plan

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
32.	Caldwell	Page 3.3	1) Is Task 0203 really important to HEDR? 2) How much time, effort, and dollars does it cost? 3) Will the results affect the HEDR Project and if so, how? 4) What result is meaningful and acceptable? 5) Will this task improve the model or reduce the uncertainty? If so, how? 6) Should this be funded by, or charged to, the HEDR/TSP funds?	NA - 1) Yes - part of model validation. 2) Considerable - around \$50K. 3) Intercomparison of models - increase credibility. 4) Within the range of other model results. 5) May indicate areas of improvement or better techniques. May indicate where uncertainties can be reduced. 6) It is. The benefit can be judged as work is completed.
33.	Barth	Page 4.1, Background	What is the rationale for selecting the time frame 1944-1957 for the water exposure pathway in Phase II?	Wording revised to explain that it is the period before good records.
34.	Till	Page 4.1, para. 2	What is different here than our earlier work on important radionuclides?	NA - more refined - confirmation.
35.	Till	Page 4.2	Are Tasks 0301 A-C reissuing the old reports?	Yes; Milestones 0301 A-E are final versions of Phase I reports.
36.	Roessler	Page 4.2	Closure of Phase I I-131 releases is a high priority. Recommend a status report be given at the May TSP meeting as implied on the next page.	NA - will report.
NA = No action.				

HEDR DOCUMENT REVIEW RECORD

Document Number PNL-7563 HEDR Document Title FY 1991 HEDR Project Plan

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
37.	Roessler	Page 4.3	Where will the iodine-131 doses to parts of the body other than the thyroid be addressed?	NA; not explicitly defined in project scope at this time. Will be defined as part of long-range planning.
38.	Barth	Page 4.4, QA	Will uncertainties in the source data be estimated? If not, why not?	NA - data quality objectives are being developed - uncertainties will be quantified. Quality objectives will be added to the mid-year revision of the plan.
39.	Shleien	Page 4.5	Please show Shleien along with Robkin as the primary TSP contacts for source term activities.	Added.
40.	Barth	Page 5.1, Scope	Why do we need to wait until the end of Phase II to accept the fact that uncertainty must be included in the formulation of the transport model?	Modified text.
41.	Roessler	Page 5.1, para. 2	I hope that the workshop and the interactions between the TSP and Battelle's personnel on this task have been complete enough to satisfy certain TSP complaints so that the endless harangue on this matter can end. If there is still debate, it should take place between TSP members and Battelle personnel specifically assigned to the task. Too much time and money have already been wasted when these detailed discussions take place in front of the whole TSP.	NA - the complaints are being addressed now.
NA = No action.				

HEDR DOCUMENT REVIEW RECORD

Document Number PNL-7563 HEDR Document Title FY 1991 HEDR Project Plan

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
42.	Murphy	Page 5.3	1) Are the resources (funds/people) available for the atmospheric transport task adequate for the proposed work elements? The first three elements represent substantial undertakings, and we must be in a good position to answer the basic "atmospheric questions" (page 5.1) at the end of Phase II. 2) Also, I thought that it had already been decided that the puff trajectory model was appropriate for the study, at least for the Phase I study area. Does this question/decision relate to an enlarged area?	NA - 1) Yes - or will be through FY 1991 contingency funds - this is important work. 2) Yes to the first part and to the second part. The final model domain may require modification to the model.
43.	Till	Page 5.3	Atmospheric Transport: It must be the objective by the end of Phase II to have in place an air dispersion model that can be used for the dose assessment in the remainder of the study.	Changed text to clarify this objective.
44.	Morrill	Page 5.4	Does the atmospheric model "upgrade and refinement" include the effects of precipitation variation and topography?	Precipitation and topography will be evaluated and the model enhanced if needed. This is part of sensitivity analysis, which will occur in FY 1991 and beyond.
45.	Caldwell	Pages 5.5-5.7	Will a bibliography for ground water be developed similar to that for surface water (page 5.8)?	Yes; now stated in milestone descriptions.
NA = No action.				

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46.	Caldwell	Pages 5.5-5.7	Will the bibliography include titles of classified water-related documents used and a timetable for declassification?	NA - the time table can be estimated depending on TSP prioritization of declassification work.
47.	Kopeccky	Pages 5.6-5.7	No time frame is mentioned in the description of the groundwater migration task.	Text changed to clarify: 1944-1989.
48.	Caldwell	Page 5.9, QA	1) Will determinations or comments on the quality of the data used in the ground and surface water tasks be documented and included in subsequent reports? 2) Comments about how the data used was verified or validated must be included. Comments about why the selected data were used and the rejected data were not should also be included.	Yes; text (under "QA") changed to clarify.
49.	Caldwell	Pages 6.1-6.2	Subtask 0502, Scope, L-2 to L-1: When will data be extended after 1951?	NA. Because we have been directed to have a revised dose model in place by the end of Phase II, the post-1951 work must be completed by the end of Phase II, as information for developing and validating the revised model. The TSP could authorize this work to begin at mid-year of FY 1991, to be funded out of FY 1991 reserves.
NA = No action.				

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Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
50.	Roessler	Pages 6.1-6.2, Task 0502	<p>This work should not be delayed. The excellent January 1990 document, "Biases and Corresponding Conversion and Adjustment Factors for Measurements of Iodine-131 Concentrations in Vegetation Collected from 1945 through 1947" should be resumed. The work addressed some important deficiencies in the vegetation data and developed what appears to be some scientifically sound procedures to make the numbers more accurate. It is necessary to validate the dose estimates with this data before individual dose estimates are made available to the HTDS. The milestone date on 0502A should be May 1991 instead of September 1991. This part of Task 05 should proceed simultaneously with 0403C or, if both can't go at the same time, 0403C should be delayed.</p>	<p>NA - TSP authorized go-ahead for this work.</p>
51.	Caldwell	Page 6.3, Approach	<p>Library searches, contacts with agencies and individuals, and results should be included as an appendix for each task (used and non-used data).</p>	<p>NA - these data quality objectives are being developed for each task and used in Phase II.</p>
52.	Barth	Page 6.3, QA	<p>On what basis will it be determined whether it is necessary to develop quality assurance and control for the absorption measurements in vegetation?</p>	<p>NA - data quality objectives are being developed for each task and will be included in the mid-year revision of the plan.</p>
NA = No action.				

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Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
53.	Price	Page 7.1	The reviews of the food consumption estimates for the general population suggested the following: Obtain actual distributions for milk consumption. Check the backcasting method by comparing the backcast estimates from the 1977 data with the 1965 data. Revise the large number of categories to a smaller number of meaningful categories.	NA. These activities need to be considered in future Phase II planning.
(a)				
(b)				
(c)				
54.	Walker	Page 7.2	The current approach continues to place the burden of completing necessary work disproportionately on the tribes. No detailed plans or proposals for the meaningful involvement of the tribes are included in the work plan. Migrant workers should receive at least some attention in Phase II.	NA - TSP Native American working group is developing a process.
55.	Walker	Page 7.2		Added "migrant workers" to list of special populations to be studied over life of project.
NA = No action.				

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Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
56.	Morrill, Price	Page 7.3	Milk Model: We should describe and utilize the actual distribution of variability in milk consumption, rather than rely on an arbitrary statistical parameter. This is one of the most important cases where an actual distribution is available and could reduce uncertainty.	NA - this approach needs to be considered in future Phase II planning.
57.	Till	Page 7.3, Approach	We should get more than one additional expert to help review the data on feeding regimes and the milk network.	NA - Results of first expert's analysis will be used to determine whether a second and/or third expert needs to be used.
58.	Price	Page 7.3	Milk Model: 1) I was under the impression that at least two additional experts would be used to verify the subjective estimates. I can provide additional suggestions. Also: 2) we have discussed the desirability of trying to obtain the source of milk for school lunch programs. This is important in areas such as Pendleton where this milk may have been supplied by dairies in either the Walla Walla or the Tri-Cities area.	1) NA - see #57. 2) NA - needs to be considered in future Phase II planning.
NA = No action.				

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Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
59.	Morrill	Page 7.3	1) There isn't any detail here of the item noted on page 7.1 about information of milk systems outside the Phase I study area as a help to the HTDS in selecting control areas. 2) Actually, the control area choice depends far more on the possible extension of the spatial coverage of the atmospheric models. Is that discussed in the appropriate place?	1) NA - a little investigative work is being done in this area, but no scope or funding has been provided. 2) NA - some work is being done in this area, under Task 04, to support HTDS work.
60.	Roessler	Page 8.1	This task is a very high priority.	NA
61.	Price	Page 8.1	There needs to be a carefully thought-out protocol to obtain food consumption and other information for persons wanting individual dose estimates. Appropriate default values are needed. It may be possible to improve on the use of simple means by age and sex. For example, probes may elicit frequency of milk consumption where quantities are not known. This information can be used to improve the needed estimates.	NA - individual doses, except for HTDS requirements, are not yet funded. See Task 0703.
62.	Till	Page 8.1, para. 3	Will we have the capability at the end of Phase II to calculate individual dose estimates?	Yes; text changed to clarify.
63.	Barth	Page 8.1, Scope	Why is model validation not included as part of the FY91 Task 07 activities?	NA - TSP priority was not high enough for approved funds.
NA = No action.				

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Document Number PNL-7563 HEDR

Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
64.	Kopecky	Page 8.3	Second and third lines from the bottom: Please clarify what is meant by "the need for a more rigorous interface between the air dispersion model and source term inputs and the air pathway model."	Text clarified.
65.	Roessler	Page 8.3	Tribal Doses: This still has a tone of something less than full commitment. All efforts should be directed at ensuring that this is completed. To do so may involve more liaison between TSP Demography persons and Battelle as the tribes are visited.	NA - the TSP Native American working group of the Demography Subcommittee is developing a "process paper" - PNL is on standby but will participate as needed.
66.	Kopecky	Page 8.4	HTDS Doses: 1) Under "Scope," revise the first sentence as "This subtask will calculate doses for a minimum of approximately 450 individuals in the pilot phase of the HTDS." 2) Under "Approach," revise the first sentence as "Dose estimates for individuals in the HTDS pilot study, along with characterizations of the uncertainty of those estimates, will be calculated using the Phase II code and will be delivered to HTDS on magnetic media." 3) Also, add the following sentence at the end: "Since these dose estimates are calculated for the use of the HTDS, no report that lists, summarizes, or otherwise presents information about the dose estimates will be prepared by HEDR." 4) Under Milestones,	Text modified to address all four points.
NA = No action.				

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Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
67.	Roessler	Page 8.4	<p>revise the sentence as "0703A dose estimates and uncertainties for individuals in the HTDS pilot study on electronic media (tentatively, September 1991)."</p> <p>HTDS Doses: I don't like the implication that work may extend into FY 1992. Is this because of FHCRC's lack of getting the appropriate data together or because of Battelle's delays? If it is the latter, this must be corrected.</p>	<p>NA - Battelle will be ready - See FHCRC has indicated a slip. See #66.</p>
68.	Roessler	Page 8.4	<p>"Model Parameters" is of utmost importance. It is second only to finalizing the work in 0703 and 0602 and definitely more important than work on other radionuclides due to the possibility of high doses in radiosensitive groups in the population and the sensitivity of this issue with the public. Exposures of babies and the embryo/fetus should not be treated lightly.</p>	<p>NA - agree - re-proposed to TSP for FY 1991 funding.</p>
69.	Barth	Page 8.5	<p>Iodine Transfer Factors: Wasn't a review of available literature on iodine transfer factors completed as part of Phase I?</p>	<p>NA - milestone scheduled in Phase I, but postponed to Phase II.</p>
70.	Caldwell	Page 8.5, Approach	<p>Will a bibliography be developed of used and unused data related to transfer factors and age dependent dose factors?</p>	<p>Yes; text clarified.</p>
<p>NA = No action.</p>				

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Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
71.	Kopecky	Page 8.5, para. 3	Fetal radioiodine doses are important for the HTDS. Revise the second sentence as "This work will include developing fetal-age-dependent prenatal dose factors for radioiodines." I assume "time-dependency" of dose factors is intended to refer to dependency on fetal age.	NA - this work is planned for the second half of FY 1991 but the funds are subject to re-direction to Native American work in April.
72.	Kopecky	Page 8.5, para. 4	Please define "NORCUS" and/or explain why the fact that a NORCUS post-doc will do the work is significant.	Deleted sentence.
73.	Barth	Page 8.5	Milestones to the TSP: 1) Why will it take until September 1991 to prepare a draft report documenting model parameters, 2) including iodine transfer factors for values already used in Phase I?	NA - 1) work delayed until mid-year by TSP. Subject to re-direction to Native American work. 2) only preliminary factors used in Phase I; they need at least verification.
74.	Caldwell	Page 8.5	What does the acronym NORCUS mean?	Deleted.
75.	Barth	Page 9.1, Background	1) Why has the TSP not had access to "preliminary sensitivity analyses" which indicate that uncertainty in the atmospheric dispersion of radionuclides is the largest contributor to dose uncertainties? 2) Did the "preliminary sensitivity analyses" include adequate consideration of the contribution of uncertainties in transfer	NA - 1) Work only recently completed - document being developed at Battelle. 2) No - "final" transfer factors and their uncertainties have not yet been identified. 3) Same as #2.
NA = No action.				

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76.	Barth	Page 9.2	factors to uncertainties in doses? 3) How about uncertainties in source term definition?	February 1991.
77.	Shleien	Page 9.2	Milestones to the TSP: When will TSP receive 0202C, which was presumably completed in November 1990? What is a "loss of model correlations"? Please explain.	Phase I model consisted of several independent modules. Input from one module to another was performed randomly with no relation to mass balance vs pathway, location, time, or transport.
78.	Barth	Page 9.4, QA	Will the notes or minutes of meetings between the Statistics Task and other technical task personnel be made available to the TSP?	Notes and meeting minutes are maintained in HEDR Project files. The TSP is responsible for tracking progress of Battelle staff.
79.	Till	Page 10.1	Milestones to the TSP: This is a good example of where we must have deliverables. The work we carry out on records management must be documented in some fashion. Same comment for Information Resources covered on pages 12.2 and 12.3.	Documented in monthly report.
NA = No action.				

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80.	Shleien	Page 11.1, QA	Data verification does not appear as part of QA-- is it elsewhere (i.e., environmental data)?	NA - Data quality objectives are being developed for each task and will be included in the mid-year plan.
81.	Shleien	Page 11.1, QA	Model validation by comparison to environmental measurements--shouldn't it be here, in Task 05?	This work is described under Task 05 discussion.
82.	Barth	Page 11.2	Milestone 10A, Phase II QA Plan, is scheduled for completion in January 1991. 1) Will this be the document describing guidelines for defining and verifying achievement of data quality objectives (DQOs)? 2) Or will this document contain DQOs for the various technical tasks making Phase II? Before any new research is done on Phase II, DQOs should be defined together with a QA project plan to verify achievement of the DQOs.	1) Yes. 2) The data quality objectives are being developed by tasks and will be incorporated into the mid-year plan.
83.	Roessler	Page 13.1, Task 12	Due to the high visibility that this project has nationwide and due to the precedence that is being set in the way that this project is being managed, it is important that this task be continued at a high level.	NA - we will plan per TSP direction, which includes emphasis in communications.
84.	Walker	Page 13.1	Consider adding discussion on uncertainty in our dealings with the public.	NA - all HEDR work includes a discussion of uncertainty; we will emphasize.
NA = No action.				

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Comment Number	Commenter	Page, Paragraph	Comment Summary	Resolution
85.	Bishop, Blazek	Page 13.1, Scope	Change Subtask 1205 title to TSP meeting support.	Title changed to "TSP Database and Audio-Visual Support."
86.	Blazek	Page 13.2, Scope	Add to Video 1202, "Production costs of the video tape will be estimated. An RFP may be prepared to determine the lowest cost/highest quality production. Lead criterion for a quality video is that it be a product that can be used for the life of the project. If this criterion cannot be met, the display will be a priority."	Added to text.
87.	Blazek	Page 13.3	Milestones to the TSP: Time lines are not realistic. Work plan = March 1990 and video master = July 1990 might be closer.	Work plan submitted in Dec.; video deadline will change to July 1991.
88.	Barth	Page 13.3	Milestones to the TSP: Is the schedule for the completion of 1202A, videotape work plan (December 1990) realistic?	See #87.
89.	Blazek	Page 13.3	Public Opinion Survey. Add: "The survey will help the TSP be more flexible in meeting the public's information needs. It is important to evaluate the effectiveness of methods used now. The survey is another tool to aid the Communications Subcommittee in this evaluation."	Added text.
NA = No action.				

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90.	Shleien	Page 13.3	Why are we asking the public what it wants? We have a large PR staff in three organizations (Oregon, Washington, Battelle)--can't they figure out what an informed citizen would want?	NA - TSP set scope and priority.
91.	?	Page 13.4	Subtask 1205: Change "Washington State Support" to TSP Support.	See comment #85.
92.	Shleien	Page 13.4	Subtask 1205: The TSP has provided funds to Washington State for a computer and for audio-visual support for the TSP meetings. It appears that this activity and funding is being duplicated by Battelle.	NA - TSP set scope and funding.
93.	?	Page 13.5	Change "chairman" to "chair."	Changed.
94.	Bishop, Blazek		It is difficult/impossible to evaluate proposed tasks or prioritize work when little budget information is available. The Communications Subcommittee began work on the 1991 budget in May 1990. The group gave substantial effort to budget discussions. The Battelle budget reviewed at the October meeting did not match the figures	Added funding information to Table 1. Yes, there was a difference in the basis for cost estimating. The new planning process should preclude these misunderstandings.
				NA = No action.

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95.	Caldwell		<p>used earlier by the group. This situation cannot be allowed to recur. We plan to work with appropriate TSP/Battelle staff to develop a less painful budget process.</p> <p>Should each task have a bibliography developed of used and unused sources and data? Should such a bibliography include the justification of either inclusion or exclusion of the data?</p>	<p>NA - will incorporate in planning activities.</p>
96.	Murphy		<p>Phase II should concentrate on developing/refining relevant transport and other methodologies and on obtaining relevant data. Communications, public involvement, etc., cannot be neglected, but it is most important that we have some sound, new results to report at the end of Phase II.</p>	<p>NA - agree, will incorporate in planning.</p>
97.			<p>TSP Communications Support: I suggest any videos for the HEDR Project, if indeed one is approved, be let on open bid contract.</p>	<p>See comment #86.</p>
98.	Shleien		<p>TSP members need to look at more of the documents available at Hanford.</p>	<p>NA - Battelle will facilitate whatever access is desired.</p>
99.	Shleien		<p>One or more TSP members need to be familiar with and check over documents and data gathered in this task.</p>	<p>NA - TSP staff are welcome. Battelle will facilitate access as desired.</p>
<p>NA = No action.</p>				

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100.	Shleien		Blazek and Shleien getting clearance--they and Davis need to join Robkin in this effort to clear documents.	NA - Battelle will facilitate access.
NA = No action.				

END

DATE FILMED

03 / 05 / 91

